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Induced Abortion in China:

Trends, Patterns and Determinants

Chen Wei

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Declaration

Except where indicated, this thesis is my own work carried out during my PhD study in the Demography & Sociology Program, Research School of Social Sciences, the Australian National University from January 2001 to December 2003.

Chen Wei

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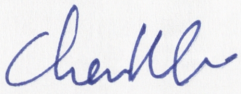

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Abstract

China has the world's largest population and the most stringent governmental family planning program. It has experienced one of the world's most remarkable fertility declines. It is widely argued that China's family planning program and the rapid fertility decline relied heavily on induced abortion. However, the issue of induced abortion in China has not been fully documented or systematically examined because of the sensitivity of the issue, inavailability of reliable data and lack of careful analysis of existing data sources. This thesis is devoted to the study of trends, patterns and determinants of induced abortion in China using quantitative approaches and data from the various fertility surveys.

China is among the countries with the least restrictive abortion laws in the world. The changes from the total ban on induced abortion in the early 1950s through a series of legal changes from the mid-1950s have produced a completely liberalized abortion policy. These changes were associated with both the transformation of socio-economic circumstances and the development of the population control policy. Trends and dynamics of induced abortion in China closely followed the development and implementation of the national family planning program. However, the rapid fertility decline was largely not the result of use of abortion. Abortion is estimated to have contributed only 15 per cent of the reduction, with the rest attributable to delayed marriage or contraceptive use. China's abortion transition was less dramatic than that in many countries experiencing similar fertility decline.

Abortion patterns and characteristics observed in China are broadly similar to those in other countries. Women of higher socio-economic status are more likely to abort a pregnancy and to have repeated abortions. On the one hand, they have stronger motivation to regulate pregnancies and have lower fertility; on the other hand, they tend to use less effective contraceptive methods though they have access to better medical facilities. However, China's family planning policy had a significant effect on abortion patterns: 36 per cent of the most recent abortions were attributed to policy restriction; and as a result of the one-child policy, women who had one child had a very high abortion rate as compared to other Asian countries. Across the provinces, stricter policy implementation was associated with higher abortion rates.

Multivariate analyses suggest that both individual and community-level characteristics had a significant influence on women's abortion rates. Individual characteristics had more powerful effects than community characteristics; however, variables capturing family planning effects had the largest impact. At the provincial level, both socio-economic development and family planning policy were significantly associated with abortion variation. While socio-economic development had a significant effect on abortion rates at all parities, the family planning effect was highly parity-specific. No effect of family planning policy was observed on the abortion rate at parity one. The effect of family planing policy was greater than that for socio-economic development at parity three plus.

Many studies have documented that reproductive behaviour in China is strongly influenced by son preference. This research also showed that women without sons were significantly more likely to have an additional birth and less likely to abort the next pregnancy. Chinese fertility in the mid-1990s would be 11 per cent lower and the abortion rate 13 per cent higher if son preference did not exist. Similarly, son preference plus sex-selective abortion had a marked effect on the sex ratio at birth in China. Data from a rural community in East China showed that 20 per cent of abortions were sex-selective, causing the sex ratio at birth to be as high as 115 males per 100 females. Since more than 90 per cent of the aborted foetuses are female, the sex ratio at birth in that community would have been normal at 105, if the sex-selective abortions did not occur. Sex-selective abortion leading to abnormal sex ratios at birth was a combined result of a culture of son preference, declining fertility and the ease of sex-determining technology.

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List of Abbreviations

AGI	The Alan Guttmacher Institute
AR	Abortion ratio
CBR	Crude birth rate
CDR	Crude death rate
DHS	Demographic and Health Survey
GAR	General abortion rate
GDP	Gross Domestic Product
GFR	General fertility rate
HC	Hazard coefficient
HR	Hazard (odds) ratio
IUD	Intra-uterine devices
MOH	Ministry of Health
NBS	National Bureau of Statistics
NDRHS	National Demographic and Reproductive Health Survey
NIR	Natural increase rate
OLS	Ordinary least squares
OR	Odds ratio
SD	Standard deviation
SFEA	Sex preference effect on abortion
SFEF	Sex preference effect on fertility
SFPC	State Family Planning Commission
SHR	Semi-standardized hazard (odds) ratio
SOR	Semi-standardized odds ratio
SRB	Sex ratio at birth
TAR	Total abortion rate
TFR	Total fertility rate

Chapter 1

Introduction

1.1 Research Background

As old as humanity, abortion has been practised in virtually all societies to regulate fertility (Devereux 1976; David 1974, 1981; United Nations 1999). Since ancient times, human communities have been attempting to control family size, largely through abortion and infanticide. When faced with unwanted pregnancies women have resorted to abortion, regardless of religious or legal sanctions and often at considerable risk (David 1974, 1981; Kingston Women's Centre 1995). Yet, periodically throughout history, particularly during the 19th century and the early 20th century, abortion was restricted under social, moral and religious, economic and political conditions (London 1982). Historically, danger associated with abortion is also an important justification for restriction.

Abortions are now carried out in every country in the world, regardless of the legal status which ranges from complete prohibition to elective procedures being obtained at the request of the pregnant woman (David 1981; Kingston Women's Centre 1995). In the circumstances of growing concerns of population and development, the considerable health consequences associated with illegal and clandestine abortions and the recognition of abortion to be a basic human right of women, as well as the developments and innovations in reproductive technology, abortion has gained increasing legalization and acceptance throughout the world, although contentious issues surrounding abortion continue to occupy a significant place in public discourse around the world (David 1974, 1981; United Nations 1999).

Historically, induced abortion played an important role in the demographic transition occurred in the 19th century in the Western countries despite the fact that Western society made abortion illegal throughout the greater part of the demographic transition (Potts 1981). No developed country has achieved low fertility without more or less reliance on induced abortion (Potts 1974; Kleinman 1974; Tietze and Bongaarts 1975). The role of induced abortion in fertility decline was most notable in Eastern European

countries, Japan and South Korea, where initial major fertility declines and attainment of low fertility were largely a result of the practice of abortion (Davis 1963; Hong and Tietze 1979; Donaldson et al. 1982; Dolian et al. 1998).

China has the world's largest population and the most stringent family planning program, and one of the world's most remarkable fertility declines occurred under these circumstances. Explanations of Chinese fertility decline have been concentrated on the dominant role of the family planning program, and to a lesser extent the effect of social and economic development (see for example Birdsall and Jamison 1983; Poston and Gu 1987; Liu 1992; Peng and Huang 1993; Yang 1994; Poston 2000). There are arguments that China's family planning program relies heavily on induced abortion (Wang et al. 1998), and concerns have been expressed that abortion policies have been applied to control population growth in China and abortion is also being misused to prevent the birth of female babies (AGI 1999).

In fact, China has never officially described induced abortion as a 'family planning' method. Before the one-child policy, China had roughly 5 million abortions each year in the 1970s under the 'Later, Longer and Fewer' policy, largely without coercion. Many women used abortion to avoid unintended pregnancies as modern contraceptives were of limited availability and had high failure rates. After 1979, the annual number of abortions increased rapidly, directly as a result of the introduction of the one-child policy despite the fact that China has always stressed the importance of education and contraceptive use, and made contraceptive methods widely available and free of charge throughout the country. However, the government repeatedly described the use of abortion as only a 'remedial measure' to prevent either unplanned (unauthorized) pregnancies or pregnancies resulting from contraceptive failure. Over the last two decades, as the small-family norm gained momentum while son preference remained at the core of fertility desires in China, abortion has been also used as a way to select the sex of children (Gu and Li, 1994; Zeng et al, 1993; Tu 1993).

There are many studies of China's fertility and family planning both domestically and internationally, but studies of specific intermediate fertility variables are limited. Also, the well-publicized controversies over the practice of abortion to terminate unplanned pregnancies in China are often fuelled by journalists' field reports and advocates'

propaganda that may represent the extreme rather than the typical situation (Tu and Smith 1995).

Induced abortion has both demographic importance and implications for women's reproductive health and human rights. Throughout the world, induced abortion has made a great contribution to fertility decline as well as to sustaining low fertility, formerly in the developed countries and later and currently in the developing world (AGI 1999). But in 1997 there were still 54 countries, encompassing one-quarter of the world's population, that either banned abortion entirely or permitted it only to save the life of the pregnant woman (Rahman et al. 1998). Abortions in these countries are illegal and unsafe, which has direct consequences for the welfare of women (AGI 1999). China is among the countries where abortion is least restrictive, permitting abortion without restriction as to reason (Rahman et al. 1998).

Despite its importance medically and socially, few systematic studies have been done on induced abortion in China. While the issue of induced abortion in China has attracted extensive international attention, the few existing studies are largely focused on small communities and are unable to provide a full picture of abortion developments. Studies on a national scale have presented abortion trends and patterns that were either derived from flawed sources before the early 1980s, or did not make full use of the recent fertility survey data to address a number of issues central to abortion assessment and policy relevance. This study is an attempt to fill the gap by empirical analysis of the levels, trends, patterns and determinants of induced abortion in China over the recent three decades. It is based mainly on China's 1997 Demographic and Reproductive Health Survey (also informally called 1997 fertility survey), and the author's field survey of sex-selective abortion in rural East China.

1.2 Literature Review: Comparative International Trends and Patterns in Abortion

1.2.1 Laws on Induced Abortion

Historically, norms and attitudes towards abortion were rather tolerant in cultural traditions, religious beliefs and legal opinions in most countries. During the 19th century, legal barriers to abortion were established throughout the Western world.

European views on the restriction of abortion were spread to the rest of the world by colonial powers in the latter part of the 19th century. China and Japan came under the influence of Western powers at the end of the 19th century, when they also criminalized abortion for the first time (David 1981; Kingston Women's Center 1995).

"From the second half of the 19th century through World War II, abortion was highly restricted almost everywhere. Liberalization of abortion laws occurred in most of the countries of Eastern and Central Europe in the 1950s and in almost all the remaining developed countries during the 1960s and 1970s. A few developing countries also relaxed their restrictions on abortion during the same period, most notably China and India." (Henshaw 1990: 78) The trend towards abortion liberalization has continued throughout the 1980s and 1990s, which has significantly affected the fertility transition all over the world.

The Alan Guttmacher Institute (1999) conducted a comprehensive examination of abortion laws in 1997 for 152 countries with a minimum population of one million which were classified into five categories: (1) 54 countries have the most restrictive laws, constituting 25 per cent of the world's population. In these countries, abortion is permitted only to save a woman's life or is prohibited altogether. Most of these countries are in Africa, Latin America, and South and West Asia; (2) 23 countries, home to 10 per cent of the world's population, have somewhat less restrictive laws that permit abortion to protect the pregnant woman's physical health; (3) 20 countries with approximately 4% of the world's population have laws that permit abortion to protect a woman's mental health; (4) six countries making up 20 percent of the world's population have laws that permit abortion on socioe-conomic grounds, as well as for the narrower grounds described above; (5) the largest category in terms of population consists of those having the least restrictive abortion laws that permit abortion without restriction as to reason; 49 countries are in this category and are home to 41 per cent of the world's population. China falls within this category, as do most industrialized countries.

1.2.2 Levels and Trends

Women have relied on abortion to end unintended pregnancies throughout history and in every region of the world, even though abortion was illegal in almost every country

until the second half of the 20th century. The trend towards abortion liberalization was accompanied by an increase in the incidence of the practice, but the spread of highly effective modern contraceptives since the 1960s has produced a declining worldwide trend in abortion.

Women around the world seek abortion for the same reason: because they have an unintended pregnancy. Couples throughout much of the world are increasingly exerting control over their reproductive lives; despite this trend, however, the incidence of unintended pregnancy remains high. About 133 million births occur in the world annually; of this total, one in four (33 million) is estimated to be unintended (AGI 1999). In addition, an estimated 46 million induced abortions are performed, bringing the total number of unintended pregnancies to about 79 million per year. In other words, almost as many unintended as intended pregnancies occur each year, and more than half of these unintended pregnancies end in abortion (Bongaarts and Westoff 2000).

In developed countries where average desired family size is small, of the 28 million pregnancies occurring every year, an estimated 49 per cent are unplanned, and 36 per cent end in abortion (AGI 1999). By contrast, in developing countries where average desired family size is large, of the 182 million pregnancies occurring every year, an estimated 36 per cent are unplanned, and 20 per cent end in abortion. At the world average, 26 per cent of pregnancies were terminated by induced abortion. Clearly, the regulation of fertility is far from perfect, and the reliance on abortion is a significant way to achieve family size desires.

Throughout the world, for every 1000 women of childbearing age each year, 35 are estimated to have an induced abortion (AGI 1999). Overall, women in developed and developing regions have strikingly similar abortion levels: 39 and 34 per 1000 women respectively.

In Africa, Asia and Latin America, abortion rates are estimated to be very similar: 31-37 per 1000 women. However, in Latin America and Africa, almost all abortions are illegal; in East Asia, virtually all are legal; and in the rest of Asia, slightly more than one-third are legal. In the developed world, abortion rates are substantially lower than the world average: 17 per 1000 in Europe (excluding Eastern Europe) and 23 per 1000

in all other developed countries together. All but a small number are legal abortions. Europe is notable because it includes the subregions with the world's highest and lowest abortion rates. In Eastern Europe, each year for every 1000 women of reproductive age, 90 have an abortion; in the rest of Europe as a whole, the rate is 17 per 1000, and in Western Europe, it is 11 per 1000.

The most striking recent trends in abortion incidence have occurred in the formerly socialist countries of Eastern and Central Europe and the former Soviet Union, where abortion rates have fallen sharply. In the late 1970s, abortion rates stood at 50-130 per 1000, and throughout the 1980s, remained stable, However, from 1991 to 1996, a decline of 20-65 per cent occurred, resulting in rates only half or one third of their 1970s levels, despite the current levels being still among the highest in the world. Abortion rates in many other developed countries have also declined. Denmark, Finland, Italy and Japan have experienced decline by 40-50 per cent from the 1975 level, but in France, Germany and the United States, the decline is smaller. Rates in England, Netherlands, Norway, Sweden and Switzerland have been relatively stable since 1980, while rates in Canada, Ireland, New Zealand and Hong Kong have been rising, although their rates are still relatively low.

Among developing countries with legal abortion statistics, patterns are varied. Rates in South Korea, Tunisia and Turkey are falling sharply; the reported abortion rate in China has also fallen. In contrast, abortion incidence in Vietnam rose sixfold between 1984 and 1992 even without taking into account the abortions in the private sector. Cuba, which has one of the world's highest abortion rates, has been relatively stable over the last two decades.

1.2.3 Patterns and Characteristics

"Throughout the world, women give similar reasons for deciding to have an abortion: They are too young or too poor to raise a child; they are estranged from or on uneasy terms with their sexual partner; they are unemployed; they do not want a child while in school; or they want or need to work" (AGI 1999: 17). These similar reasons are largely responsible for the similar patterns and characteristics of abortion with respect to age, marital status, number of living children, education, place of residence, ethnicity and some economic factors.

Women in their early 20s have the highest level of abortion in most countries, but adolescents and women aged 40 or older are the most likely to obtain an abortion if they become pregnant. The pattern of abortion rates by age is rather similar to the age pattern of fertility. Abortion rates are typically highest among women 20-24 and lowest among those younger than 20 and those in their 40s. This pattern simply confirms that women in their early 20s are the most likely to be sexually active, the most fecund and the mostly likely to become pregnant. However, when women at the two extremes of reproductive ages become pregnant, they are much more likely than those aged 20-34 to have an abortion. In other words, the proportion of pregnancies ended by abortion is greatest at the beginning and at the end of women's childbearing lives.

Abortion patterns by marital status differ substantially between developed and developing countries. In Asian countries, the incidence of abortion is higher for married than for unmarried women; in contrast, US data show that unmarried women have a higher abortion rate than married women. This largely confirms that in Asia, sexual activity tends to be limited to married women, while in developed countries, sexual intercourse frequently occurs before or outside marriage. Parity is also an important factor affecting the likelihood of a woman having an abortion. And the pattern resembles that of marital status. In developed countries, the abortion ratio for nulliparous women tends to be higher than the ratio for women with one or more children, while in developing countries, higher-parity women tend to have a higher proportion of pregnancies ended by abortion.

Women in urban areas are more likely than their rural counterparts to obtain an abortion; this may also reflect the fact that it is easier to obtain abortion services in urban than in rural areas. The relationship between abortion and education is more complex, as influenced by other social and demographic characteristics (Bankole et al. 1999). Rates calculated from sample survey data for three Central Asian countries (Kazakhstan, Kyrgyzstan and Uzbekistan) indicate that the incidence of abortion is somewhat higher among women with more than secondary education. By contrast, survey data from South Korea show that among married women, those with more than secondary education have a lower abortion rate than less educated women. Results from a study in Italy suggest that the effect of education on abortion may depend on the age of women.

Socio-economic characteristics surrounding abortion are not well understood, particularly those in the developing world. More efforts are needed to document variations and patterns of abortion both over time and across cultures. "Knowing how demographic, social and economic characteristics relate to induced abortion can be an important means of improving understanding of the circumstances surrounding women's decision to obtain an abortion and, to some extent, of the reasons leading to unintended pregnancy and abortion. Consequently, studies of differentials in abortion according to women's characteristics can help to identify subgroups in particular need of services and counseling to prevent unplanned pregnancies." (Bankole et al. 1999: 76)

1.2.4 The Role of Contraception in Reducing Abortion

It seems typical that during the process of fertility transition, induced abortion and contraceptive use will initially increase simultaneously; however, as the use of modern contraceptives continues to grow and becomes more and more effective, both the number and the rate of abortion will tend to decline. In rapidly-declining-fertility countries, such as South Korea, initial fertility decline is largely a result of abortion, and later modern contraceptives replace abortion to make the most important contribution to fertility decline. Evidence from Shanghai, China's largest city which had the earliest and most rapid fertility decline in China, also shows a similar pattern.

However, there are very different stories between countries, in ways to attain a balance between contraceptive use and reliance on abortion to control fertility. In Eastern European countries, for example, where there is an 'abortion culture', women have relied heavily on abortion to control fertility; abortion has been a predominant method of fertility control until recently, when modern contraceptives have been catching up. In some other countries, the provision of abortion remains illegal but the desire for small families is rapidly becoming stronger and more widespread, outpacing the availability of means to achieve family-size goals. This has important implications for program design and policy options, in order to reduce illegal abortions and the related health consequences.

The relationship between contraceptive use and abortion is obvious. Evidence from the United States shows that women using a method of contraception are only 15 per cent

as likely as women using no method to have an abortion (AGI 1998): contraception reduces the probability of having an abortion by 85 per cent. In the United States and other developed countries and many parts of Asia, women typically want two children. In other developing countries, small-family norms are also becoming more common. Then the choice for societies is whether to facilitate access to contraception or to leave women and their families with abortion as the means of achieving their childbearing goals. Later-fertility-transition societies can learn from earlier transitions in addressing the effectiveness of contraceptive programs to keep abortion rates low.

The relationship between contraceptive use and effectiveness and the abortion rate is established quantitatively in a recent study by Bongaarts and Westoff (2000) who developed a model linking the total abortion rate (TAR) to its direct determinants. Without fertility regulation, on average women will have eight births assuming 20 years of fecund childbearing years in a permanent sexual union and 2.5 years average birth interval. If a woman wants two births, then she needs to practise perfect contraception over three-fourths of the 20 reproductive years. However, if no contraception is practised, then she needs to have 12 abortions over the 20 years in order to have two children. In reality, most populations rely on both contraception and induced abortion to regulate fertility. Under given abortion probability (p) and contraceptive effectiveness (e), the trade-off between contraceptive prevalence and abortion is established: the increase of contraceptive prevalence from 0 to 75 per cent will result in a decrease in the total abortion rate from 4.0 to 0.4, when the intended total fertility rate (TFR) is two with p=0.5 and e=0.9. In a population with p=0.5, a 10 per cent increase in contraceptive prevalence would avert 0.45 abortions per woman, assuming contraception is 95 per cent effective. In Kazakhstan, where abortion probability is estimated to be 0.81, a combination of a nine per cent rise in contraceptive prevalence and the elimination of all contraceptive failures would suffice to reduce the total abortion rate from 1.75 to near zero.

1.2.5 Abortion and Fertility

The role of abortion in fertility decline varies over time and across countries. As a population moves through the transition from natural to controlled fertility, there are also transitions of the intermediate fertility variables. John Bongaarts (1982) calculated a typical 'synthetic' transition from the fertility behaviour found in contemporary

developing countries to that currently observed in developed countries with respect to the four major intermediate fertility variables: marriage, contraception, abortion and postpartum infecundability. In the first phase of fertility transition in which average TFR is 7.03, contraception and induced abortion have virtually no influence on fertility, and the biggest inhibiting effect is from postpartum infecundability, and to a lesser extent from delayed marriage. As the transition moves forward, marriage, contraception and induced abortion are increasingly inhibiting fertility, while post-partum infecundability becomes less significant. However, even at the final phase of fertility transition in which the average TFR is 2.06, induced abortion is far less important than contraception and marriage.

Other studies using the Bongaarts model to assess the importance of induced abortion in reducing fertility reveal a similar pattern but differences exist among countries (Frejka 1985; Johnston and Hill 1996). Frejka applies the Bongaarts model to data for nine developed and two developing countries between 1950 and 1980 and has found that in nearly all the countries studied, even those with high levels of abortion, contraceptive practice and marital patterns have been the proximate determinants with the largest fertility-reducing effects. As a rule, only very high levels of abortion, an average of three or more abortions per woman over her lifetime, will imply a larger fertility-inhibiting effect than that attributable to contraceptive use. Frejka's earlier study (1983) on the experience in Eastern Europe reaches basically the same conclusions.

However, using DHS data for 21 developing countries, Johnston and Hill (1996) found that on average, abortion appears to have an influence on fertility similar to that of contraceptive use. This influence appears to be particularly strong in the four Latin American countries in the analysis, where abortion reduces fertility by 38-55 per cent. In contrast, abortion's fertility-reducing effect is only 6-19 per cent in the Near East and 0-32 per cent in Africa. Since abortion is illegal in all but one of the countries included in the analysis, the study results imply that in many countries women are resorting to illegal, possibly unsafe, means of inducing abortion. Abortion is widely used to control fertility and has an increasing influence over time.

An earlier study (Sullivan et al. 1976) on the influence of induced abortion on Taiwanese fertility demonstrates that fertility in Taiwan in 1968 would have been 12-19

per cent higher in the absence of induced abortion. This influence is larger in cities than in rural areas, and it is estimated that one-third of the urban-rural fertility differential was due to induced abortion. However, an assessment of the relative importance of induced abortion as compared to other fertility-reducing variables was impossible at that time.

1.2.6 Studies on Induced Abortion in China

Abortion as a means to avoid unwanted births has a long history in China. According to Sun Simiao (AD 581-682), a well-known Tang Chinese physician, the Chinese were practising abortion over 2000 years ago (Himes 1970). One focus of traditional Chinese pharmacology was to protect women's reproductive health, including the development of methods to induce abortion of a 'bad' foetus (Lee and Wang 1999). Such techniques included various herbal medicines for contraception and a wide variety of abortion techniques. By the late imperial period, these contraceptive and abortifacient medicines were widely sold in cities in China. In the early 20th century, not only was abortion widely known and used in some locales, but a woman who did not know how to use abortion to prevent a birth was laughed at by fellow villages as a 'foolish wife'(Fei 1947/1981). Traditional methods, such as diagnosis through feeling the pregnant woman's pulse, have been used for thousands of years in determining the sex of a foetus (Chu 2001), sometimes followed by abortion techniques to remove a foetus of the non-preferred sex.

Thus birth control within marriage through abortion is not new in China. However, it is only recently, with the spread of modern medicine and the family planning program, that induced abortion in China has grown rapidly and contributed greatly to one of the world's most rapid and successful fertility declines.

According to the data published by Ministry of Health, the magnitude of induced abortions was very small before the beginning of the family planning program in the early 1970s, since most pregnant women chose delivery rather than induced abortion and there were no restrictions on the number of births at that time. According to Hardee-Cleaveland and Banister (1988), the total number of induced abortions was 3.9 million in 1971 at the start of the family planning program. During the first period of family planning policy the number of induced abortions gradually increased. In 1978,

the number of induced abortions reached 5.4 million. Then the total number of induced abortions increased rapidly to 9.5 million in 1980. Since the one-child policy was implemented in 1980, the number of induced abortions has increased substantially. In 1983, the number of induced abortions reached 14.4 million, which was the peak for induced abortions (see Table 3.1 in Chapter 3).

As few systematic data on abortion in China have been made public to date, most of the several published studies on induced abortion in China draw upon surveys of regional or small areas. Studies dealing with family planning and population policies peripherally touch upon the issues of induced abortions. Because of the lack of empirical data, previously published papers do not fully reflect the complex phenomenon of induced abortion dynamics in China.

The first empirical study of abortion in China to appear in an international journal was the investigation by Feng and Chen (1983) of the trends and patterns of induced abortions in Xian City (the capital of North-West China's Shaanxi Province) in the late 1970s. A sample survey of 1062 women aged 20-49 in one of the five districts of Xian City was conducted in 1981. It was found that nearly half of the sample women had had at least one induced abortion. Few women with no children had abortions. Once a woman had a child, her likelihood of having an abortion became very high; among such women, the proportion of pregnancies ending in abortion rose from 39 per cent in 1977 to 88 per cent in 1981. Of women with two or more children who became pregnant in 1981, 96 per cent had an abortion. According to the survey results, the incidence of abortion in Xian City was comparable to the highest level in the world at that time. Induced abortions had become a very important fertility control method in China, which was trying to encourage couples to have only one child. By 1981, the number of abortions in Xian City had exceeded the number of births. The wide use of induced abortion had certainly contributed to the success of family planning in the late 1970s.

Tien (1987) addressed the issues of abortion incidence and regional variations in China and the role of abortion in China's population planning successes up to the early 1980s. He used abortion number and ratio data from family planning statistics both for China as a whole and for four provinces, Shanghai, Zhejiang, Hebei and Gansu. He observed that both the abortion number and incidence increased apparently with the implementation of the family planning policy. However, the rise of abortion ratios was

facilitated by the decline in fertility which reflected China's large successes in curbing fertility through other means. The surge of abortion incidence in the early 1980s was also partly attributable to age-structure effect. The proportion of men and women aged 20-29 in the population reached an all-time high in China in 1982. This increase in the number of persons of marriageable age, together with lowered age requirements for marriage, contributed to more first births, and prevention of births of second and higher parities had become more necessary. As a result, resort to abortion, as a back-up method, became more frequent in 1982. At the regional level, four patterns were observed: at the high end were Shanghai and Beijing, where the abortion ratios were two to five times larger than the national ratio. Immediately next to these leaders were such provinces as Zhejiang, with the abortion ratio twice the national average. The third group of provinces, such as Hebei, had an abortion ratio around the national total. At the low end were such provinces as Gansu accommodating abortion ratios between one-third and half of the national figure. While population planning successes and abortion ratios were positively related, regional variations in abortion incidence cannot be totally explained by the differential vigour in the implementation of the one-child policy.

Li et al. (1990) reported the results of a survey of 1200 women aged 20-48 undergoing the abortion procedure and their immediate prior contracepting behaviour in nine clinic sites in three provinces in China (Shanghai, Jiangsu and Sichuan) in August 1985. The number of previous abortions reported ranged from none to five. Nearly half of the abortion recipients had had at least one prior abortion and 18 per cent had had two or more prior abortions. Education, age, marriage duration and residence have apparent effects on abortion order. When looking at the current abortions by prior number of children by marriage duration, it is obvious that the one-child policy had a significant effect on abortion. In rural areas, women married before 1980 were obtaining the current abortion only after already having had two or more children, while more recently married women were doing so after having had only a single child. However, in urban areas, regardless of the marriage duration, women were undergoing the current abortion after having only a single child. So both the population policy and socio-economic changes were affecting the likelihood of women having an abortion. Most of the women (72 per cent) claimed to have been using a contraceptive method at the time they became pregnant, and IUD was the principal method of contraception among the 1200 abortion recipients regardless of age, residence, education or occupation.

However, 46 per cent of the IUD users claimed their pregnancy was a result of IUD expulsion. While this problem appears in part behavioural, since no other method had been substituted to avert pregnancy, it also suggests a high incidence of method failure.

Wang and Wang (1991) reported on a much larger sample survey in eight provinces of China in 1988. In their sample of 12000 married women aged 20-44, 58 per cent of the urban women and 49 per cent of the rural women reported at least one induced abortion, 20 per cent and 14 per cent respectively reported having repeated abortion, and four per cent in each category reported three or more abortions. Number and sex of the prior children have a significant influence on the subsequent abortions. For example, in urban areas, 96 per cent of women who already had one child, and 99 per cent of women who had two children aborted the subsequent pregnancies; while in rural areas, the percentage aborting was 51 per cent if the first child was a girl compared to 60 per cent when the first child was a boy, and 62 per cent if the first two children were both boys, compared to only 38 per cent if the first two children were both girls. Among the last abortions, 31 per cent in urban and 17 per cent in rural areas were due to contraceptive failure, roughly 20 per cent in both urban and rural areas aborted the last pregnancies because they wanted no more children, and about 30 per cent were voluntary abortions to meet the government requirement for population control. Persuaded abortions were 11.1 per cent in rural areas compared to only 1.6 per cent in urban areas. These results imply that urban women used abortion to avoid unwanted births well before the one-child policy, while rural women more frequently used abortion only in recent years. As a result of sex preference, rural women not only had a much lower probability of aborting subsequent pregnancies, but also strongly discriminated according to the sex of the previous children, while for urban women, nearly all the subsequent pregnancies ended in abortion. As over 80 per cent of women are contraceptive users, high abortion rates reflect relatively low use-effectiveness of contraception and that most unplanned pregnancies are aborted.

Tu and Smith (1995) examined the determinants of induced abortions in China through a multivariate analysis using data from a survey of 8603 married women younger than 35 conducted in four counties in North China in 1991-1992. This analysis features the effect of the number and sex composition of children born for all pregnancies that occurred during the 1985-90 period; the effect of the sex of the first child; and the interval between the first birth and the current pregnancy for pregnancies among parity-

one women. Women had a high risk of undergoing abortions after their first live birth because most (82%) had become pregnant again without meeting the official requirements for the time between the first and second births. The likelihood that a pregnancy will be aborted is strongly determined by official family planning policy and regulations; individual and household socio-economic status plays a relatively insignificant role. The probability for a pregnancy to end in an abortion increased significantly with a woman's parity. Almost no induced abortions were found for pregnancies before the first live birth and almost universal abortions occurred after the second child. The marked and significant variations in the incidence of abortion after the first birth across counties and villages and over time show the dominant roles of institutional factors and changing policy in determining individuals' reproductive behaviour.

Qiao (2001a, 2001b, 2002) made an important attempt in using the 1997 fertility survey data to investigate the issue of induced abortion in China. He estimated levels of induced abortion in the 1990s and examined patterns and determinants of induced abortion in China. Abortion levels derived from this survey are lower than the estimates based on the abortion data published by Ministry of Health of China. However, there are systematic differences in incidence of abortion between women of different socio-economic characteristics. China's population policy and women's own socio-economic characteristics are significantly associated with abortion patterns. The relatively high rate of induced abortion is due largely to the requirements of family planning policies. However, the incentive for women that led to induced abortion is not to obtain a certain number of children, but to control the sex of the child, mainly to have a son. In Qiao's multivariate analysis of determinants of abortions which occurred in 1997, urban residence, Han nationality and age are positively and significantly associated with abortion incidence, while education is not a significant factor. Qiao's studies represent an important step towards understanding the levels, patterns and determinants of induced abortion in China over the recent two decades, despite the fact that more detailed and systematic analyses can be done, and his regression model can be extended and improved to address a range of issues that have not been touched upon in his studies but are important and remain unsolved. One of the important conclusions from his studies is that fertility declines in the 1990s in China were not caused by the number of induced abortions but rather by the transition of fertility ideology.

Until recently premarital sexual activity and induced abortion among unmarried women have been rare in China; however, because of the sweeping socio-economic transition,

induced abortions among unmarried women have increased sharply over the recent two decades, particularly in the large cities. Wu et al. (1992) described the changing situation of induced abortions among unmarried women in the largest city, Shanghai. They showed that the abortion rate among single women aged 15-19 increased from 5 per 1000 women to 56 per 1000 women from 1982 to 1988; increased fourfold among unmarried women aged 20-24 and 30-35; and more than doubled among women aged 25-29. This paper concluded that sexual activity had increased among unmarried men and women in urban areas. The sexual activity among unmarried men and women in China not only exists but is fairly prevalent and appears to be increasing; this may increase the ratio of abortions to live births beyond the already high number. One researcher (Wang 1999) argued that the increase in induced abortions in Shanghai was partly attributable to the increase in the floating population consisting predominantly of young people from elsewhere in China. The extent of sexual activity, the risk of conception and the proportion of induced abortions among pregnant, unmarried women in the floating population are higher than those of women who are permanent residents. Based on a 1992 survey of women in seven provinces, research found that since the 1980s, the rate of conception among unmarried women has explicitly increased leading to an increased rate of induced abortions among unmarried women (Xu 1998). Even so, the proportion of induced abortions in unmarried women among all the women in their reproductive period (ages 15-49) is not high in China. Zhu et al. (1997) found that the proportion of unmarried women having induced abortions was 16 per cent in some urban areas. The main cause of unwanted pregnancies is the failure of contraceptive methods. Surveys of induced abortion in Shanghai, Zhengzhou and Qingdao showed that 50-60 per cent of induced abortions resulted from contraceptive failure (Wang 1999; Wu et al. 1992; Zhu et al. 1997).

An extensive literature has touched peripherally upon the issue of induced abortion in China in terms of the sex ratio at birth, contraceptive patterns, reproductive health and the family planning program. Of major importance are the papers written by Banister (1984), Banister and Harbaugh (1991), Crane and Finkle (1989), Li (1995), Bongaarts and Greenhalgh (1985), Greenhalgh (1986), Greenhalgh et al (1994), Kaufman et al. (1989, 1992), Poston (1986), Aird (1990), Johansson and Nygren (1991), Hull (1990), Hull and Yang (1991), Hull and Wen (1992), Tien et al. (1992), Coale and Banister (1994), Zeng et al. (1993), Zeng (1995), Greenhalgh and Winckler (2001), and Scharping (2003). Some of the views and findings in this literature, as well as the mainstream China abortion studies, will be referred to in later chapters.

1.3 Research Questions and Objectives

The review of the changes in abortion patterns in China, as well as in the world, has revealed substantial and radical changes in abortion as well as the important contributing factors. There are trends and patterns in China broadly similar to those in the rest of the world; however, the Chinese characteristics are striking. Nevertheless, some important questions remain partly or fully unsolved, and there is a need to explore the development of induced abortion in China: on a national basis, what are the incidence and rate of abortion in China as compared to other countries? Did China have a similar transition of abortion during the fertility transition over the last 30 years? How do the socio-economic patterns in China resemble or contrast to the patterns observed in other countries? How did the implementation of the family planning program as well as other factors affect abortion trends and variations at the national and regional level? What role is abortion playing in fertility decline in China? How important is it as a strategy in achieving son preference? So the theme of this study is to examine levels, trends and determinants of induced abortion in China both over time and across regions.

The specific objectives of the study are as follows:

(1) To examine levels and trends in induced abortion in China

Levels and trends in induced abortion in China are only roughly known for the total number of abortions before 1990, and abortion rates in individual years. Data on total numbers are available for the 1990s both from the Ministry of Health (MOH) and State Family Planning Commission (SFPC). The incidence and rate of abortion can be calculated from 1988 and 1997 fertility surveys. As with the general fertility rate (GFR) and total fertility rate (TFR), we can also calculate the general abortion rate (GAR) and total abortion rate (TAR), and these indicators can be used to compare China to other countries. On the other hand, levels and trends in induced abortion in China should be examined in the context of development of the family planning program, as policy periods have clearly produced abortion periods.

(2) To analyse patterns and characteristics of induced abortion in China

Patterns and characteristics of induced abortion observed elsewhere are also relevant to China, despite the fact that China's family planning program has reduced the differences between women's various social and economic groups. Bivariate analysis is a basic step in understanding patterns and characteristics of induced abortion. Also regional diversity is a hallmark of China's abortion patterns as a result of both differing socio-economic development and varied family planning program strength across the provinces.

(3) To explore the role of induced abortion in fertility decline in China

The Bongaarts model of intermediate fertility variables makes it possible to decompose fertility decline into its four major components including induced abortion. Both the relative and absolute contributions of abortion can be assessed through comparison with those of the other variables. The importance of abortion in fertility decline may vary over time and across regions.

(4) To identify the factors affecting women having abortions in China

The bivariate analysis can demonstrate the existence of abortion differentials between various socio-economic variables, but multivariate analysis is necessary to address the question of the extent to which the effects of these variables are maintained when the differing background characteristics of women are controlled. Logistic regression will be used to model the likelihood of abortion, ordered-logistic regression will be used to analyse the lifetime abortions, and hazard models will be used to explore the probability and timing of abortion mainly focusing on the effect of sex preference.

1.4 Hypotheses

The study will test the following main hypotheses:

(1) Trends in induced abortion in China are associated with the development of the family planning program.

This will be examined through the time-series data on fertility, abortion and changes of family planning policies, and also through the investigation of abortion patterns and

differentials between urban and rural areas and among the regions representing a diversity of population policies.

(2) The extent of influence of family planning on induced abortion is highly parity-specific.

This will be addressed at the provincial level using factor analysis. Parity-specific abortion rates are regressed against the various components of China's socio-economic development and family planning at the provincial level. The strength of the family planning program can be assessed compared with other components across the parity.

(3) Induced abortion accounts for fewer averted births than contraceptive use or delayed marriage in China.

A decomposition analysis using the Bongaarts model of proximate determinants is used to quantify the averted fertility attributable to marriage postponement, contraceptive use and induced abortion. These are the three major components of China's family planning program.

(4) Induced abortion is more likely to occur among women of higher socio-economic status (e.g. urban, more educated and wealthier women).

Both probability and number of abortions will be analysed according to women's socio-economic and demographic characteristics, and the relative independence and strength of the socio-economic variables will be determined by multivariate regression analyses.

(5) Women with daughters only will be less likely to have induced abortions compared to women who have either sons or a combination of sons and daughters.

This will be addressed by life table and survival analysis using pregnancy and abortion event history data.

(6) Sex-selective abortion is the major reason underlying the abnormally high sex ratio at birth in China.

Patterns and determinants of the sex ratio at birth in China will be analysed to shed light on the issue of sex-selective childbearing, and a case study will focus on the evidence of sex-selective abortion and abnormal sex ratio at birth in rural East China.

1.5 Data

Data used in this thesis come from three sources: (1) China's most recent fertility surveys and census, namely the 1988, 1997 and 2001 fertility surveys and the 2000 census. This study mainly uses the 1997 fertility survey data, the computer record data file. The 1988 fertility survey data used in this thesis are from published tabulations. At the later stage of the thesis writing, the 2001 fertility survey and 2000 census dataset become available and are used mainly for analysis of the recent trends and patterns of the sex ratio at birth in China. (2) Official statistics on population, fertility and abortion change at both the national and provincial levels. These data are contained in various statistical yearbooks published in China. Data on population and socio-economic development are published in the *China Statistical Yearbook*; data on population and fertility are published in the *China Population Statistical Yearbook* and *China Family Planning Yearbook*; data on induced abortion and contraceptive use are published in the *China Health Yearbook* and *China Family Planning Yearbook*. (3) The author's own field survey data on fertility and sex-selective abortion. The author conducted a questionnaire survey between October and December 2002 in rural East China collecting both quantitative and qualitative data on son preference and sex-selective abortion.

(1) 1997 National Demographic and Reproductive Health Survey

The main data source of this study is China's 1997 fertility survey, which is formally called the 1997 National Demographic and Reproductive Health Survey. This is China's fourth national fertility survey, but specifically focuses, for the first time in China's relevant surveys, on reproductive health including induced abortions (SFPC 1997). The survey was conducted in two phases: the first phase is between 10 and 20 September 1997, applying stratified, multi-stage, cluster, probability proportional sampling method to select the sample points. The 31 provinces of China are the 31 strata, and three-stage sampling is applied to each province. The sample unit in the first stage sampling is county (or county-level city and district); the number of counties in each province is drawn by the PPS method. The sample unit in the second stage sampling is township (or town and street); the number of townships in each county is

drawn by the PPS method. The sample unit in the third stage sampling is resident group, and only one resident group is randomly drawn from the selected townships. All the residents in the selected resident group are enumerated. Thus, 1042 sample points from 337 counties from 31 provinces are selected, with 180 thousand people enumerated. A household questionnaire is applied containing 11 items asking for general information regarding sex, date of birth, residence status, migration status, marital status, date of first marriage, number of children ever born, and the contraceptive method currently used.

The sample women of reproductive age (15-49) established in the first stage are then applied to be the sampling frame for the second-stage survey. The number of women and sampling fraction are calculated for each sample point, then women are selected with equal interval. Finally a subsample of 15213 women of reproductive age is drawn for the second-stage survey collecting detailed information on reproductive health.

The second-stage survey was conducted in mid-November 1997 using an individual questionnaire of eight topics containing over 90 questions. The eight topics comprise: (a) woman's basic information relating to her date of birth, ethnic group, education, marital status, date of first marriage, and her husband's ethnicity and education; (b) menstruation care and health status relating to age at menarche and menstruation-related knowledge, maternal care-related knowledge and practices, and premarital medical examination; (c) conception and childbearing, which is the most detailed part of the questionnaire, covering questions of pregnancy and childbearing history, child health, prenatal check, induced abortion, infecundity, and child adoption; (d) contraceptive use, including contraceptive method used at the first sex and current use, contraceptive availability, reasons for non-use, contraceptive failure and contraceptive knowledge; (e) family planning technical services, including family planning operations and technical competence of service providers; (f) STDs and AIDS, including the related knowledge and sources of knowledge; (g) health care at menopause, relating to age at menopause and the needs for care at menopause; and (h) other matters, including knowledge and information wanted, and economic assistance received. An English version of the questionnaire can be found in the Annex II.

Questions about induced abortions are organized in two ways within topic 3: a detailed pregnancy history was asked, including time and outcome of each pregnancy, breastfeeding, and child health. There are six possible choices for the outcome of each pregnancy: live-born boy, live-born girl, stillbirth, spontaneous abortion, induced

abortion, and currently pregnant. In addition, a series of separate questions were asked regarding the last induced abortion, including reason, gestation period, ultrasound use, place, and health effect. This study mainly draws on the data of this part.

The 1997 survey is nationally representative with a sample population of 15213 women; a post-enumeration check indicates fairly good data quality (Wang 2001). Detailed examination and calculation of recent fertility from the survey point to some under-reporting in births and abortions (Guo 2000); nevertheless, abortion patterns and characteristics, which in most cases are in relative terms, should still be considered relatively accurate.

However, data collected in the 1997 survey have three major limitations. One is the sample size, which is very small compared to previous surveys. The fertility surveys in 1982, 1988 and 1992 have invariably very large sample size (from 380 thousand to 2 million), and may be the largest of this kind around the world. The 1997 survey involved only 15 thousand women representative at the national level. While the previous fertility surveys are largely towards understanding the historical and present fertility change, patterns and determinants, the 1997 survey shifted its focus onto reproductive health including induced abortion, largely as a result of addressing the need for re-orientation of China's family planning, responding to the 1994 Cairo Population and Development Conference and paralleling the Demographic and Health Survey conducted elsewhere. The sample size makes the information generated more likely to be subject to random error, especially when the sample is broken down by multiple classifications. This is more so at the provincial level. However, this study largely focuses on the national trends and patterns. The second limitation is the lack of information on the social and economic characteristics of the individual women, which are the independent determinants of induced abortion. There are only three genuine exogenous socio-economic variables: ethnicity, respondent's place of residence and educational attainment at the time of the survey. Other variables commonly addressed in international abortion studies, employment status or occupation, income or poverty status, and religion, are not available from the 1997 survey. Finally a major limitation is the exclusion of never-married women in the survey; this is a deficit common to all the fertility surveys in China. This is largely because of the sensitivity of addressing questions about contraceptive use and sexual behaviour to the unmarried, predominantly adolescents and young adults; and in fact, in the 1980s, premarital sex and pregnancy rarely occurred in China. However, the exclusion of never-married women from national fertility surveys is not unique to China. Never-married women in

the United States were also consistently excluded from national fertility surveys before 1982 because of the perceived sensitivity of the questions involved (Li and Newcomer 1996). However, in view of the growing evidence of increasing premarital sexual activity in China and pregnancies to unmarried women virtually always being aborted, there is apparent importance in including never-married women in fertility surveys and for the family planning services to reach single women and men in China. Unfortunately this is still not the case for the 2001 fertility survey.

Data from the 1988 and 2001 fertilitys survey and from 2000 census are also used in this study. The 1988 fertility survey, focusing on women's contraceptive use history, has a sample size of 2 million women aged 15-57, representative at both the national and provincial levels. The 2001 fertility survey is similar to the 1997 survey but has a larger sample size (nearly 40 thousand women aged 15-49). Data on births by sex from these two fertility surveys are used to present the trends and dynamics of sex ratio at birth in China over the last 50 years. 2000 census data are available for only a sub-sample of 1 per 1000 of the population; the birth data from this subsample are used to examine the patterns and determinants of the sex ratio at birth in China.

(2) Published Statistics

Published statistics are mainly from a range of statistical yearbooks in various sectors in China. The government's ministries or commissions publish yearbooks containing the special data in each sector as well as commonly needed comprehensive statistics both at national and provincial level. These data are used in two ways in this study: providing background information in population and fertility change in China; and examining national trends and provincial variations in abortion rate and in provincial-level analysis of abortion patterns and determinants.

(3) Field Survey Data

As a case study, data on sex-selective abortion were obtained by the author in rural East China through a questionnaire survey conducted between October and December 2002. Detailed descriptions of the data and methods of collecting the data are presented in Chapter 7. The survey questionnaire is attached in Annex II.

1.6 Methodology

A range of demographic and statistical modelling techniques are used in this study. Apart from the simple demographic measures and period analysis, the Bongaarts model of proximate determinants of fertility is used to assess the relative contribution of the major proximate determinants to fertility decline in China. The substantive quantitative study of abortion involves bivariate analysis establishing the patterns and characteristics of induced abortion with respect to age, place of residence, education, ethnicity, women's previous reproductive experience (parity, number of prior abortions and pregnancy interval), women's attitudes towards induced abortion and rural community characteristics, and multivariate regression modelling of the determinants of abortion both at individual and provincial level, addressing the issue of the extent to which the effects of these variables are maintained after controlling for women's background characteristics. Regression techniques include logistic regression, ordered-logit models, factor analysis and survival analysis. Each of the techniques is discussed in more detail where first used in the thesis.

The basic abortion measures applied are abortion rate, abortion ratio and abortion proportion. The general abortion rate is calculated by dividing number of abortions by number of women at reproductive ages; however, the total abortion rate is obtained by multiplying the general abortion rate by 30 (women's reproductive span between 15 and 44), which is frequently adopted in abortion studies when age-specific abortion rates are not available. The abortion ratio is the ratio of number of abortions to number of births; the abortion proportion is simply the proportion of induced abortions among the total pregnancies. In the multivariate analysis, different techniques are used to address the need for an appropriate method according to the nature of the dependent variable. The statistical software involved in cross-tabulation and regression analysis is STATA 7.0 and SPSS 11.0.

1.7 Thesis Structure

In the next chapter, an overview of China's family planning program and fertility transition is presented, providing the context and background of the abortion patterns and trends in China examined in the later chapters.

Chapter 3 assesses the abortion levels and trends in China since the early 1970s and the role of induced abortion in China's fertility decline. Abortion regulations and laws are also examined, and China's abortion dynamics are put into international perspective.

Chapter 4 examines patterns and characteristics of induced abortion in China, involving mainly bivariate analysis establishing the patterns and characteristics of induced abortion. Since China differs vastly in the whole range of social, demographic and economic development and implementation of the family planning policy across the provinces, regional and provincial patterns of induced abortion are examined and highlighted.

Chapter 5 analyses the factors affecting induced abortion in China in the multivariate context. Three types of multivariate regression models are conducted: a logistic regression to look at the likelihood of abortion, two ordered-logit models to examine the lifetime abortion, and a factor analysis to explore provincial variations in abortion. The multivariate analyses address the question of the effect of various factors while controlling for other background characteristics, that is, the effect of one variable net of the effect of the other variables.

In Chapter 6, influence of son preference on induced abortion in China is investigated. Trends and patterns of sex ratio at birth are first examined to shed light on sex-selective abortion and childbearing; survival analyses are conducted to address the effect of son preference on fertility and abortion; and finally the effect of son preference on fertility and abortion is estimated quantitatively.

In Chapter 7, circumstances surrounding son preference are explored based on a village survey conducted in rural East China, providing direct quantitative evidence on sex-selective abortions.

Finally Chapter 8 summarizes the major findings from the preceding chapters with some of the implications. Limitations of this research and the gaps for future research are also discussed.

Chapter 2

Fertility and Family Planning in China

2.1 Introduction

Numerous studies over the past three decades have assessed levels, trends and patterns and determinants of fertility in China. The well-established fact in the literature is the extraordinarily rapid fertility decline within a very short period of time, while the controversial issue remains the way the decline has been achieved. Many studies assert that the family planning program, using both contraception and induced abortion, played a dominant role in fertility decline, while some other studies, having examined the relationship between socio-economic development, family planning program and fertility decline, argue that the level of socio-economic development and the performance of the family planing program are interrelated and both have played an important role in fertility decline (see for example, Tien 1984; Poston and Gu 1987; Wang 1987; Yang 1990; Peng 1991; Lin and Liu 1997).

This chapter briefly discusses the Chinese fertility transition, providing the immediate context for the demographic analysis of induced abortion in the next and remaining chapters. Chinese fertility transition is far from uniform across time and region, reflecting a dynamic combination of the forces underlying the changes. The chapter begins with a discussion of fertility trends in the context of changing family planning policies. The national fertility transition is then disaggregated into regional patterns. The Chinese experience is compared to the rest of the developing world to establish the magnitude and pace of fertility decline in China. Finally regional data across time are analysed, assessing the importance of the family planning program and socio-economic development in China's fertility decline.

2.2 Trends in Fertility and Family Planning Policy

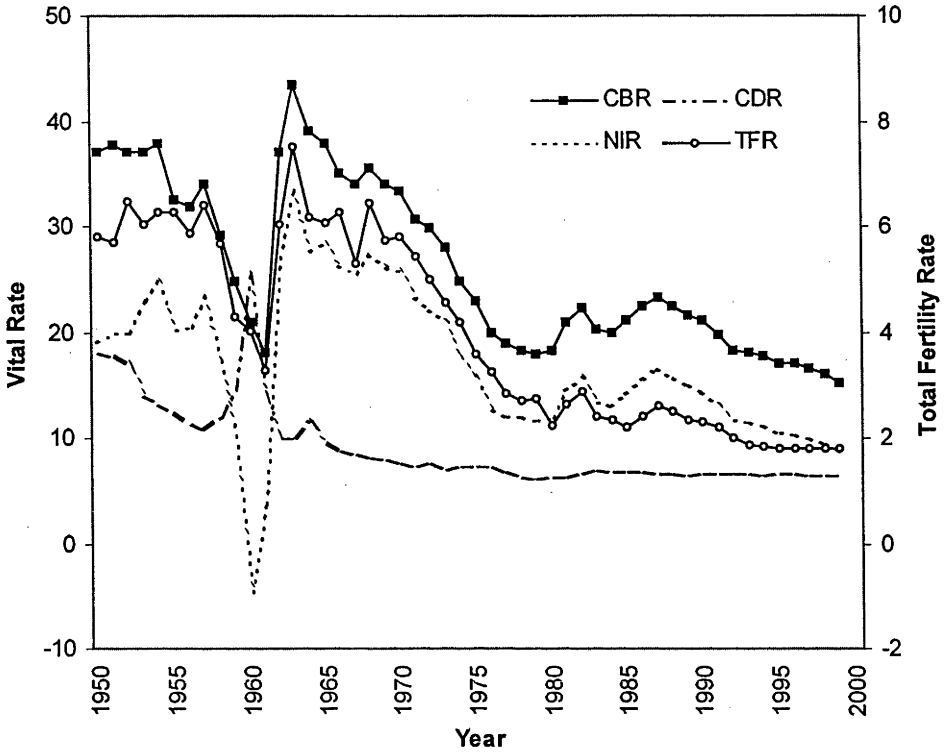
The change in fertility patterns has been one of the most radical revolutions in contemporary China. A number of censuses and surveys plus an extensive body of studies have consistently documented and examined the rapid fertility transition in

China over the last 30 years (see for example Coale 1984; Lin 1986; Banister 1987; Peng 1991; Hull and Yang 1991; Gu 1994; Feeney 1994; Chen 1995; Zha 1996; Tu 2000; Scharping 2003).

The fertility transition in China can be roughly divided into four phases on a national basis: pre-transitional fertility during the 1950s and 1960s; first fertility transition in the 1970s; buffered fertility in the 1980s; and finally the second fertility transition in the 1990s (Figure 2.1). However, urban and rural populations in China differed substantially in both the onset and pace of fertility decline (Figure 2.2). There are reflections of social, political, economic and population control policy changes in each of the phases, and there are indications that they differed between urban and rural China.

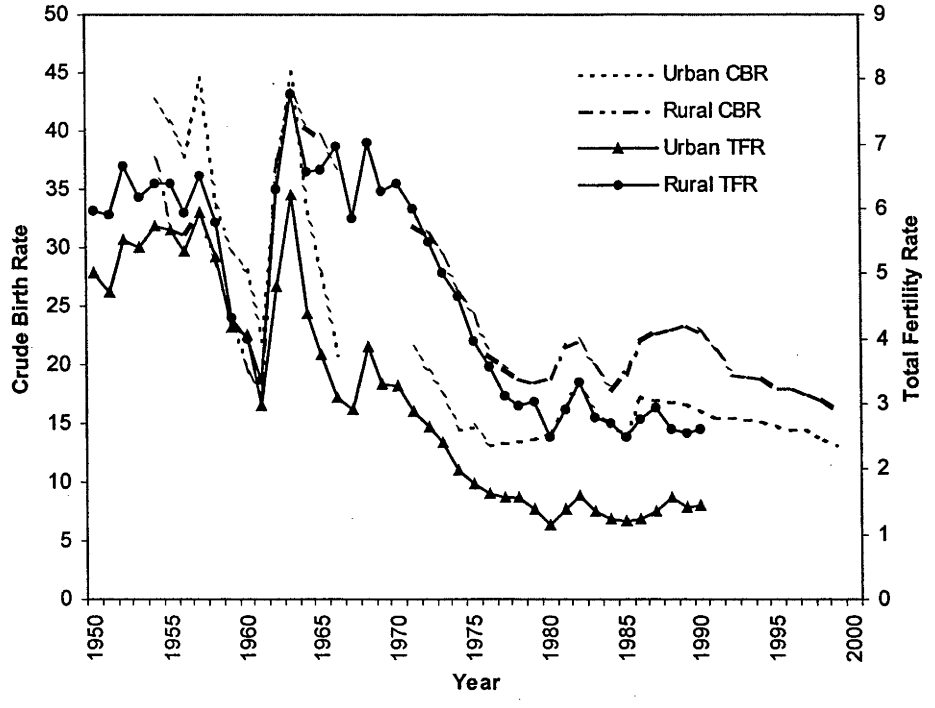
There are large declines and increases in fertility in the first phase surrounding the famine and economic recovery from the late 1950s to the early 1960s. This is largely a result of political and economic mistakes associated with the Great Leap Forward campaign aiming at organizing and building China into a communist society and economically surpassing the UK and catching up with the USA. However, fertility was increasing in much of the 1950s, as normal life was established after 1949 when the People's Republic of China was founded at the end of the third civil war. At that time, the policies of the government were pronatalist in the Cold War international environment, and China blindly emulated the planned economic model and population policy of the Soviet Union (Wang 1987). The 1958-1961 Chinese famine was the largest in human history, causing 30 million premature deaths and 33 million lost or postponed births (Ashton et al. 1984). The total fertility rate dropped suddenly from 6.4 in 1957 to 3.3 in 1961. The economic recovery that followed brought fertility markedly up to 7.5 in 1963. In the following four years, fertility gradually declined and reached a level similar to that of the late 1950s. Despite the drastic changes in fertility associated with the complicated political and economic processes during this pre-transition phase, smoothing of the fertility curve by moving the peak into the dip suggests that fertility in this phase remained between 5.5 and 6.5, with most years having a TFR around 6.0. In this pre-transitional stage, initial consideration of population control was activated by the first family planning campaign during 1954-1958 following the first population census in 1953, which alarmed the government with excessively rapid population growth. However, no substantive work was carried out in the oppressive political atmosphere.

Figure 2.1 Trends in total fertility rate and vital rates, China, 1950-1999



Source: Yao and Yin (1994); Zhuang and Zhang (2003).

Figure 2.2 Trends in crude birth rate and total fertility rate, urban and rural China, 1950-1999



Source: Yao and Yin (1994); Zhuang and Zhang (2003).

Fertility in China experienced a sustained and rapid decline in the 1970s. The second family planning campaign from 1962 to1966 significantly affected urban fertility and even some more-developed coastal rural areas. However, the family planning efforts, as well as other normal socio-economic activities, were abandoned during the political struggle of the Cultural Revolution. Fertility was high and fluctuating during the high tide of the Cultural Revolution in the late 1960s. The Cultural Revolution destroyed the Chinese economy. By the early 1970s, many of the economic indicators including *per capita* grain production were lower than the levels in the mid-1960s or even the mid-1950s (Zhai 1999) while the population was growing rapidly. With strong determination, the Chinese government resumed the family planning work, but this campaign, unlike the first two family planning campaigns, was carried out on a nationwide basis with vigour and consistency.

In 1971 the State Council issued Document No. 51 calling for government at all levels to strengthen leadership in family planning work and carry out propaganda and education for family planning throughout the country, except for sparsely populated minority nationality areas. The natural increase rate of population should be reduced year by year, to be under one per cent in the cities and 1.5 per cent in rural areas by 1975. In 1973, the State Council set up a leadership group for family planning, which later became an independent government department the State Family Planning Commission. Every province established the family planning institution successively; the family planning work was carried out rapidly and consistently throughout the country. The family planning policy was described as 'Later, Longer and Fewer': 'Later' means postponement of marriage for men until age 25 and women to age 23; 'Longer' is a four-year spacing between the first and the second child; 'Fewer' promotes an ideal of two children. In 1978, the central government explicitly proposed a policy advocating one child for most people, and two children with over three-year spacing for others. A range of 14 contraceptive methods was provided free of charge from 1974, and family planning operations (IUD insertion, sterilization and induced abortion) were not only free but also rewarded with paid leave and allowances. The extraordinary involvement of 300 million women of reproductive age in the unprecedented family planning campaign reduced the national TFR by half in only eight years: from 5.8 in 1970 to 2.7 in 1978.

In spite of the implementation of the one-child policy from 1979 and various contraception or abortion campaigns, fertility decline slowed in the 1980s. In fact, the TFR in 1989 was similar to that of 1980 despite some fluctuations observed between these dates. Significant fluctuations in fertility in the 1980s were the combined result of policy changes, economic reform, and age structure and tempo effect of marriage and childbearing. In September 1980, at the third session of the National People's Congress of China, the State Council announced the adjustment of the family planning policy, calling for determined measures to carry out a one-child policy throughout China (except in the sparsely populated minority nationality areas) in order for the national population not to surpass 1.2 billion by the year 2000. An open letter was immediately issued calling party members and government officials to take leading roles in practising this policy. The letter repeatedly stated the urgency for the one-child policy, but emphasized that priority should be placed on ideological and education work, and coercive and commanding measures should never be taken to implement the family planning policy.

However, despite the wording 'encourage one child for one couple', when the policy was implemented, each couple had no other choice than to have only one child except in some special circumstances; and this highly restrictive policy was applied equally to urban and rural areas. In the early 1980s, the government tried to implement this restrictive policy by launching a series of forceful nationwide campaigns on birth control operations including sterilization and abortion, and the campaigns reached their zenith in 1983. In order to achieve the population planning target, many women were forced to have an induced abortion even in cases of the first pregnancy (Ma 1993).

The one-child family planning campaign produced a mass backlash in rural areas. Resistance came not only from the peasant families, but also from the grass-roots cadres who had to enforce the policy. The results were either massive coercion and commandism in implementing the policy or inability to enforce it and letting it go in rural childbearing. The dilemma was intensified by the rural economic reform which undermined the collective and administrative management while it heightened the economic productive function of the family, favouring a more male labour force. As a result, in early 1984, the government liberalized the one-child policy by 'opening a small hole to close the big hole' (*kai xiao kou, du da kou*). This adjustment was initiated in some local areas in East China's Shandong Province, and was spread to the

rest of the country in 1986. An upsurge of fertility occurred between 1986 and 1988, as a result of the cadres and public having over-responded allowing policy to slip towards a *de facto* two-child norm and allowing implementation to become lax. The age structure changes had also contributed to this fertility increase.

With fertility rising alarmingly, the government restated the family planning policy, calling for strengthening policy enforcement while stabilizing the current policy. The 1990 population census reported a figure of 1.13 billion, which was 10 million more than previous government projections, suggesting an annual underreporting of more than one million between the 1982 and 1990 censuses (Feng and Ma 1999). Tightening up the policy was considered, and family planning regulations at provincial levels were formulated and enforced to adjust the policy to local circumstances. Policy reinforcement in the early 1990s was to close some of the loopholes created by the mid-1980s adjustment, and to confront the third peak of marriages and births in the first half of the 1990s. The formal policy remained stable, while in practice, reinforcing the policy turned out to be a tightening from the *de facto* informal two-child approach, and particularly targeted multiple births (births after two children). A new management approach was sought in this campaign. The central government made the top party and government leaders at province level and lower personally responsible for successful policy enforcement, and to give heavy weight to the accomplishment of the birth targets in evaluation of their work achievements and political promotions. This is described as the 'one-vote veto' system (*yi piao fou jue zhi*), which has been enforced up to now.

As a result of the intensified pressure, in the early 1990s there were once again crash campaigns in most provinces of China to abort all unauthorized pregnancies and sterilize one member of all couples who went beyond their one- or two-child limit. This was particularly applied to the perceived problem areas of central and south China. The campaigns brought fertility below replacement level for China as a whole, largely resulting from fertility decline of the high-fertility populous provinces. Both the achievement of below-replacement fertility, and the awareness of the instability of low fertility resulting from administratively-induced fertility decline, created and promoted reforms in China's family planning in 1993. Three important steps have made the family planning work in the 1990s different from the previous implementation. In 1993, the government restated and re-emphasised the 'three priorities' developed from local experience in the 1980s in Shandong and Jilin Province. This approach gives priority in

family planning work to propaganda and education over administrative or economic enforcement, pre-pregnancy contraception over post-pregnancy resolution (abortion), and routine work over crash campaigns. The second step is what is described as 'three integrations', which integrates family planning into developing the agricultural village economy, helping farmers achieve a modestly comfortable standard of living, and constructing civilized and happy families. This approach looks at the family planning program beyond the mere demographic variables and links it up with other development processes, and also brings other government departments into the family planning program. Many provinces have worked out their localized models which have fairly effectively affected farmers' reproductive behaviour. The most recent approach addresses quality of care in family planning after the 1994 Cairo UN Conference on Population and Development and the 1995 Beijing World Conference on Women. By 'making people the core', this approach addresses the needs of and provides quality services to the reproductive couples in family planning. One important step was to abolish the birth quota system which is central to China's family planning program. The quality-of-care approach was initially experimented with in six counties in East China in 1996, and was extended to 660 counties throughout China by 2000. In an interview with the family planning officials in Zhejiang Province, the author was told that the quota limits on annual births were already abolished; in addition, removal of the previous limits on age and timing of marriage and first birth is being considered. In Zhejiang Province, thousands of couples who are legal entitled to have the second child are voluntarily giving up the quota. The one-child norm, and the below-replacement fertility, have been reinforced by the rapid socio-economic development in the 1990s, at least in East China.

2.3 Regional Patterns of Fertility Decline in China

All the provinces of China have generally followed the national pattern of the time sequence of fertility transition, but there are enormous differences, largely as a result of differentials in socio-economic development and implementation of the family planning policy. Broadly speaking, timing of the start of family planning activities spread from the municipalities and some coastal provinces in the 1950s for the first family planning campaign, to Central China provinces in the 1960s for the second family planning campaign, and finally to the provinces in West China in the 1970s for

the third family planning campaign. Provincial fertility changes generally followed these patterns (Table 2.1).

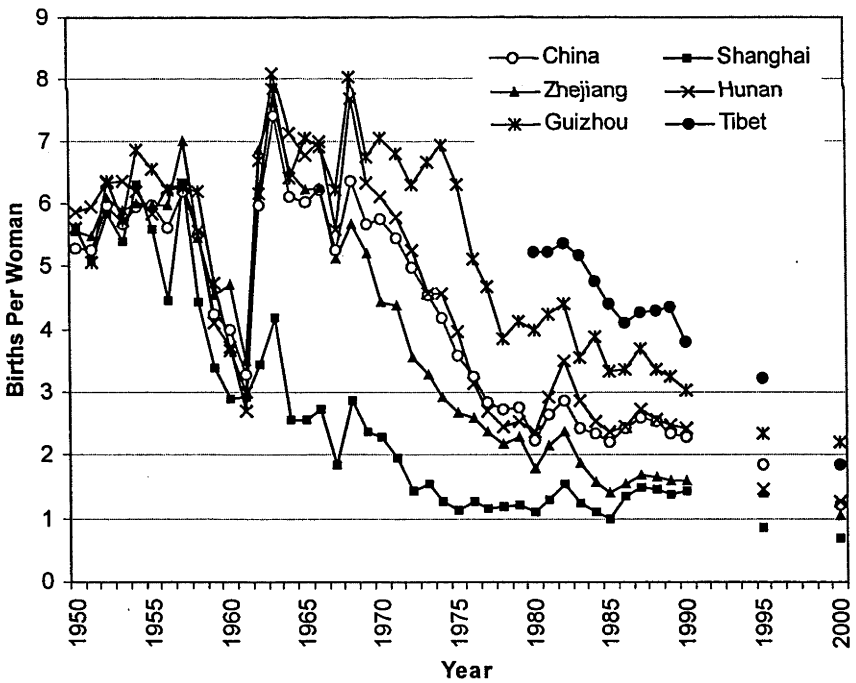
Table 2.1 Total fertility rate by provinces, China, 1950-2000

Province	1950	1955	1965	1970	1975	1980	1985	1990	1995	2000
Total	5.29	5.98	6.02	5.75	3.58	2.32	2.12	2.31	1.80	1.22
Beijing	6.33	6.22	3.50	3.58	1.34	1.60	1.28	1.31	0.86	0.67
Tianjin	6.20	7.92	4.39	3.36	1.98	1.39	1.45	1.61	1.26	0.88
Hebei	5.14	5.89	5.92	5.50	2.57	2.38	2.27	2.48	1.62	1.29
Shanxi	4.63	5.67	5.91	5.75	3.40	2.25	2.35	2.44	1.81	1.44
Inner Mongolia	4.91	6.18	6.38	6.08	3.42	2.51	1.99	2.13	1.72	1.09
Liaoning	5.47	7.34	5.54	4.23	2.13	1.76	1.23	1.56	1.33	0.98
Jilin	7.10	6.88	6.58	6.21	2.53	1.84	1.50	1.87	1.35	0.84
Heilongjiang	6.67	6.45	6.10	5.62	3.32	2.23	1.57	1.91	1.30	0.88
Shanghai	5.60	5.59	2.55	2.28	1.12	0.87	1.00	1.23	0.85	0.68
Jiangsu	5.08	5.91	5.39	4.54	2.22	1.46	1.48	2.01	1.30	0.97
Zhejiang	5.57	5.97	6.23	4.42	2.68	1.84	1.31	1.59	1.39	1.04
Anhui	4.95	5.09	6.47	6.44	3.67	2.83	2.29	2.49	1.58	1.33
Fujian	5.27	6.23	6.46	6.09	4.22	2.05	2.40	2.57	1.57	1.03
Jiangxi	5.90	5.52	6.54	6.97	5.83	3.03	2.57	2.62	2.02	1.59
Shandong	4.65	6.12	5.61	5.92	3.01	1.81	1.81	2.11	1.08	1.16
Henan	5.00	5.66	6.13	6.38	3.53	2.43	1.98	2.90	1.57	1.44
Hubei	5.26	6.29	6.18	5.97	3.23	2.22	2.38	2.46	1.85	1.06
Hunan	5.87	5.83	6.76	6.11	3.97	2.38	2.31	2.43	1.46	1.27
Guangdong	5.01	5.26	5.61	5.56	3.81	3.51	2.49	2.48	2.01	0.94
Guangxi	5.29	5.79	6.55	5.76	5.03	3.91	3.60	2.71	2.16	1.54
Hainan			4.64	5.29	4.34	4.32	2.80	3.03	2.39	1.54
Chongqing										1.26
Sichuan	5.42	6.28	6.29	6.43	4.45	1.61	1.84	2.00	1.62	1.23
Guizhou	5.61	6.55	7.04	7.04	6.28	3.73	3.22	3.03	2.33	2.19
Yunnan	5.61	6.50	6.71	5.98	5.33	3.24	2.96	2.67	2.11	1.81
Tibet			4.33	5.40	4.94	5.19	4.49	3.81	3.23	1.85
Shaanxi	5.12	5.99	5.34	5.51	3.30	2.20	2.60	2.67	1.77	1.13
Gansu	6.29	6.68	6.68	6.76	3.58	2.59	2.44	2.30	1.97	1.32
Qinghai	4.47	5.50	5.72	6.16	5.00	3.94	2.48	2.59	2.09	1.54
Ningxia	8.68	6.42	6.13	6.05	6.32	4.05	2.70	2.60	1.92	1.69
Xinjiang	4.57	4.48	6.66	6.29	4.89	3.26	3.62	3.13	1.94	1.52

Source: TFRs from 1950-1990 are from Chen Shengli and Ansley J. Coale, 1993, *Manual of Fertility by Provinces of China* (in Chinese), Beijing: China Population Publishing House. 1995 and 2000 TFRs come from National Bureau of Statistics of China (1995 TFRs are adjusted figures based on the 1995 One-Percent Sample Survey and 2000 figures are the 2000 census results).

Roughly the provinces fall into five categories (Chen 1995; Li Jianmin 2000): (1) the large city pattern (Shanghai, Beijing and Tianjin), represented by Shanghai, in which fertility started decline in the mid-1950s and declined to below replacement in the early 1970s; (2) the East China Pattern (Zhejiang, Jiangsu, Liaoning, Jilin, Helongjiang, Hebei and Fujian), represented by Zhejiang, where fertility began to decline in the early 1960s and was down to below replacement in the late 1970s; (3) the Central China Pattern (Hubei, Hunan, Sichuan, Shaanxi, Henan, Shanxi, Jiangxi, Guangdong, Guangxi, Anhui, Inner Mongolia and Gansu), represented by Hunan, starting decline in the early 1970s and completing transition in the late 1990s; (4) the West China Pattern (Guizhou, Yunnan, Qinghai, Ningxia and Xinjiang) represented by Guizhou, where fertility decline began in the late 1970s and was near completion by the end of the 1990s; and (5) the Xizang (Tibet) Pattern, a very irregular pattern with large rises and falls, starting the transition in the late 1980s. Figure 2.3 depicts the five regional patterns in fertility transition.

Figure 2.3 Regional patterns of fertility transition, China, 1950-2000

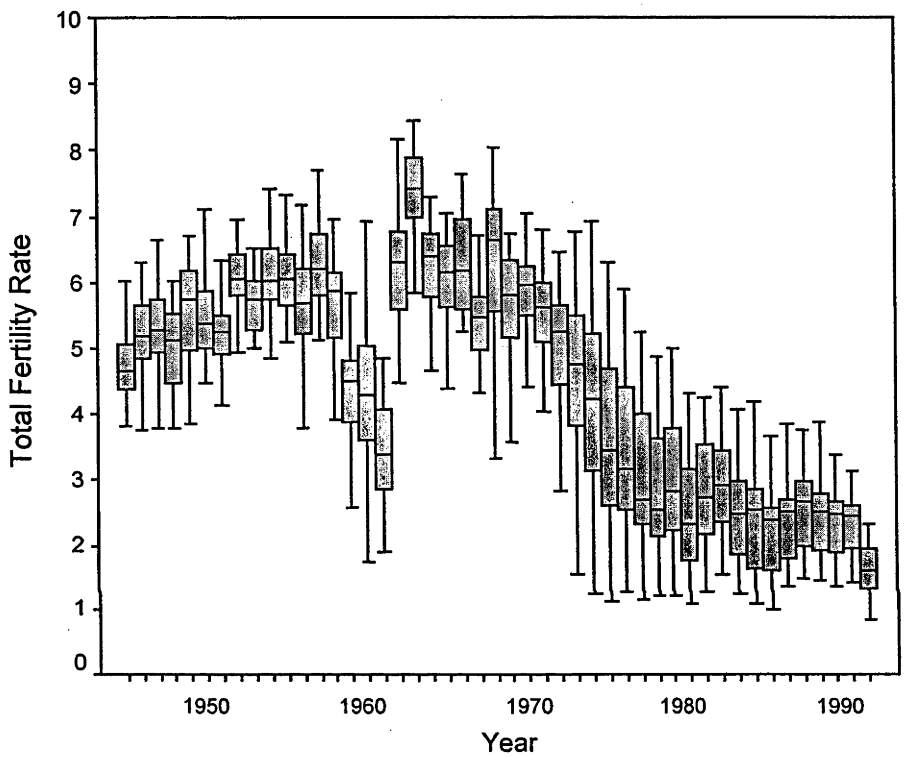


Source: Table 2.1.

Figure 2.4 presents the regional variation in total fertility rate over the last five decades. Before the 1970s, regional TFRs were around 6.0, characterized by a more or less chaotic status. In the 1970s when the marked fertility decline occurred, regional

variation widened; this was largely associated with different responses to the introduction and implementation of the family planning program in both timing and strength. Over the last two decades, fertility decline has been less remarkable as fertility was already low; however, a marked decline occurred in the mid-1990s bringing fertility down to below-replacement level. Regional variation narrowed in the 1990s.

Figure 2.4 Box plots for provincial variation in total fertility rate, China, 1945-1995



Source: Table 2.1.

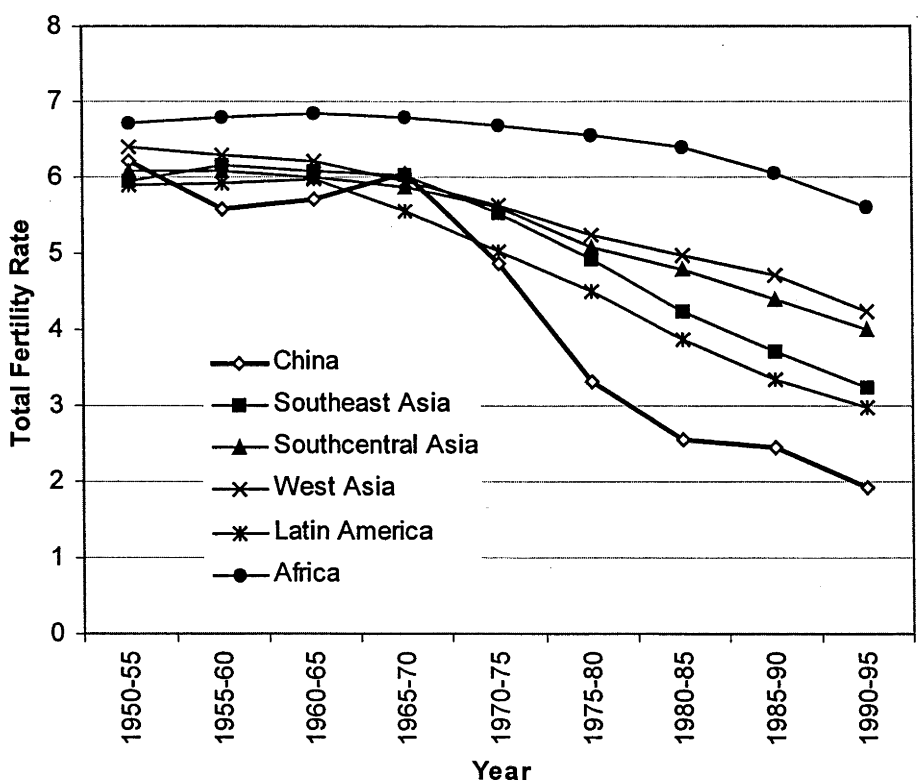
2.4 China's Fertility Decline in International Perspective

Compared to other countries, "China's rapid fertility decline is more surprising and significant for having occurred in the largest country in the world. It is more surprising because, insofar as fertility decline reflects government policy initiatives, larger countries pose greater challenges. It is more significant because an interest in world population growth will weigh larger populations more heavily than smaller ones." (Feeney 1994: 120).

The appreciation of the rapidity of Chinese fertility decline is established through comparison with that of other regions and countries in Figure 5 and Table 2. In the

1950s and 1960s, fertility in China was high and similar to that of other regions (fertility in Africa was markedly higher throughout the period). Beginning in the 1970s, Chinese fertility increasingly deviated from the common path of other regions. TFR in China decreased from 6 in 1965-70 to 2.5 in 1980-85 and less than 2.0 in 1990-95, while fertility decline in other regions also occurred but at a much slower pace. Thus by 1990-95, total fertility rates for other areas ranged from nearly six in Africa to three in Latin America, all far above the level in China. The contrast between China and other countries in the rate of fertility decline is striking, as shown in Table 2.2. The Table is from Feeney and Mason (2001) who calculated the rate of decline in total fertility rate for countries that had experienced a sufficient fertility decline by 1990 according to UN fertility estimates. The rate of decline is estimated using a least-square regression, expressed in units of children per woman per decade. Compared to most of the countries, China had a more or less late onset of fertility decline; however, the pace of decline in China was most rapid. In many cases, the rate in China is twice that of other countries. Within the East and Southeast Asian context of rapid fertility decline, fertility decline in China is still noticeably higher, and only Singapore had a rate slightly below that of China.

Figure 2.5 Fertility decline: China compared with other regions of the developing world



Source: United Nations (2001b).

Table 2.2 Total Fertility Rates: comparison between China and selected countries or areas

Countries or areas	Total Fertility Rate		Fertility Decline			Rate of Decline
	1960-64	1990-94	Onset	Level	Duration	
East and Southeast Asia						
China	5.6	2.0	1968	5.8	22	2.4
Hong Kong	5.3	1.2	1963	4.8	16	1.6
Taiwan	5.5	1.8	1954	6.5	31	1.5
Japan	2.0	1.5	1934	4.9	39	1.0
South Korea	5.4	1.7	1961	5.6	23	1.5
Singapore	4.9	1.7	1954	6.4	23	2.0
Thailand	6.4	2.1	1964	6.4	28	1.7
Malaysia	6.7	3.6	1957	6.8	55	0.9
Indonesia	5.4	2.9	1968	5.5	25	1.0
Latin America and Caribbean						
Brazil	6.2	2.9	1958	6.2	58	1.0
Chile	5.3	2.5	1962	5.2	60	1.4
Colombia	6.8	2.7	1960	6.8	61	1.3
Costa Rica	6.9	3.1	1955	6.9	77	1.1
Dominican Republic	7.3	3.1	1960	7.4	72	1.4
Ecuador	6.7	3.5	1967	6.6	55	1.2
Jamaica	5.6	2.4	1970	5.2	27	1.3
Mexico	6.8	3.2	1969	6.7	50	1.4
Panama	5.9	2.9	1963	5.8	53	1.0
Peru	6.9	3.4	1966	6.8	61	1.4
Venezuela	6.7	3.3	1960	6.5	62	1.0
Middle East						
Egypt	7.1	3.9	1962	6.9	49	1.0
Kuwait	7.3	3.1	1969	7.3	48	1.7
Morocco	7.2	3.8	1970	7.1	42	1.5
Tunisia	7.2	3.2	1966	7.0	46	1.4

Source: Feeney and Mason (2001: 73), Table 3.3. Reproduced with the permission of Stanford University Press.

China's fertility decline has been 'extraordinarily and unexpectedly rapid' to the extent that the decline is 'unprecedented in human history apart from periods of famine, epidemics, or wars' (Freedman 1995: 8). The decline is undoubtedly attributable largely to China's family planning program, but the family planning program has not 'operated in a vacuum' (Birdsall and Jamison 1983: 651); both China's political institutions and its socio-economic development have contributed to the program performance. In addition, changes in social structure and economic development had also modified people's reproductive norms and behaviour, particularly in urban areas,

even before the national family planning program in the 1970s. 'The international community did not anticipate the magnitude and rapidity of China's fertility decline, in part because it failed to appreciate China's significant progress in health and education' (Freedman 1995: 9). Without doubt, the substantial socio-economic transition in the recent two decades has added weight the development effects on fertility decline.

2.5 Socio-Economic Development, Family Planning and Fertility Decline

Fertility transition in China reflects the effects of both socio-economic development and the compulsory family planning program. However, few studies have empirically assessed the two components contributing to fertility decline in China. Poston and Gu (1987), Poston (2000) and Lin and Liu (1997) used cross-sectional data to examine the development-family planning-fertility relationship among the provinces of China, demonstrating the important role of both that operated independently and together to influence fertility change in China. This section addresses this issue more adequately across time and region to investigate the independent effect of socio-economic development and family planning in fertility decline in China.

The hypothesis that will be tested is as follows: both socio-economic development and family planning have independently important roles in fertility decline in China, and it is expected that over the last three decades, the role of socio-economic development has increased while that of family planning has decreased. Data used to address this issue are a range of socio-economic and family planning indicators across the provinces of China at three time points: 1980, 1990 and 2000. This makes it possible to examine the dynamic nature of the development-family planning-fertility relationship.

Table 2.3 presents the variables used in this analysis and their descriptive statistics. Economic level and structure are represented by *per capita* GDP in Chinese yuan, the percentage of the population that is urban, the percentage of economic output that is contributed by industry, and the percentage of the employed population that is in non-agricultural activities. Number of doctors per 10 thousand population and number of students with middle-school education (7-12 years of schooling) per 10 thousand population capture the health and education dimension of the populations. The four family planning variables capture the different components of the family planning

program. Contraceptive prevalence rate is self-explanatory; multiple birth rate is the percentage of all births that belong to parity three or over, birth planning rate is the percentage of all births that are authorized, and late marriage rate is the percentage of women who are married at age 23 or over. These four variables represent the extent to which the family planning policy is implemented in the regional populations.

Table 2.3 Descriptive statistics of the variables used in the analysis

	1980		1990		2000	
Variables	**Mean**	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**
Total fertility rate	2.48	0.87	2.30	0.47	1.23	0.35
GDP *per capita*	489.29	468.71	1871.07	1125.16	8919.86	6783.38
% urban	23.35	14.16	31.13	16.62	40.35	16.90
% industry	70.07	10.72	74.27	10.94	72.75	12.49
% non-agricultural	30.49	17.26	44.88	19.32	50.27	15.06
Number of doctors	14.01	6.38	18.66	8.74	19.62	8.18
Number of students	2686.43	960.06	3402.93	1003.62	4508.78	839.19
Contraceptive prevalence rate	79.66	11.60	87.60	5.42	89.93	2.19
Multiple birth rate	17.34	12.49	20.19	12.04	5.56	5.45
Birth planning rate	68.15	11.30	82.41	10.11	94.83	4.07
Late marriage rate	83.87	13.88	54.58	13.32	57.72	13.96

Source: China Statistical Yearbook, China Family Planning Yearbook and China Population Yearbook for various years.

Unlike other studies addressing a similar issue, this analysis uses the principal component method to extract the socio-economic factor and the family planning factor by suppressing the data structure of the variables in Table 2.3 to remove multicolinearity among the variables. However, in the few previous studies, the typical method is to regress fertility directly against the socio-economic and family planning variables. The method used in this analysis has advantages that are both statistically and conceptually important. Tables 2.4 and 2.5 show the factor scores generated by the principal component method. The provinces are ranked according to the values of the scores. The ranking according to socio-economic development across time is much more stable than the ranking according to the family planning work. This suggests that family planning can work independently from socio-economic development. However, the bottom parts of both tables contain the provinces in West China, while the ranking of other provinces change fairly markedly according to family planning strength.

Figure 2.6 displays the relationship between total fertility rate and socio-economic development in the left panel and the relationship between total fertility rate and family planning strength in the right panel. An important finding is that variance in total fertility rate explained by socio-economic development is increasing while the variance explained by family planning decreases across time. Table 2.6 examines the independent role of the two components in fertility by multiple linear regression. Across time, both socio-economic development and family planning have had a highly significant impact on fertility. However, their relationship is of a dynamic nature. The Beta values are the standardized regression coefficients providing a comparison of the relative strength of the two components. In 1980, family planning had a much large absolute value than did socio-economic development; this provides support to the well-established argument that in the 1970s China's fertility decline was largely driven by the family planning program. However, in 1990, the relationship reached some balance: socio-economic development and family planning had about the same Beta value. Economic reform in the 1980s played an increasing role, while it is also believed that the economic reform, which changed the structure of society, disrupted some of the family planning mechanisms. In the 1990s occurred the most substantial socio-economic and value system transition, and fertility, following significant fluctuations in the 1980s, also dropped to below replacement. Both socio-economic development and family planning work have a significant impact on fertility, but the balance inclined towards socio-economic development. This is an important and impressive finding of such a dynamic balance, with 1990 as the turning point. Sustained low fertility in China in the future will largely depend on the direction and structure of socio-economic development.

Table 2.4 Socio-economic development in the provinces of China, ranked by factor score

Province	1980	Province	1990	Province	2000
Shanghai	3.22	Shanghai	2.75	Shanghai	2.78
Beijing	2.29	Beijing	2.64	Beijing	2.55
Tianjin	1.72	Tianjin	1.78	Tianjin	1.74
Liaoning	0.86	Liaoning	0.83	Guangdong	0.77
Qinghai	0.82	Xinjiang	0.80	Liaoning	0.60
Helongjiang	0.56	Helongjiang	0.55	Zhejiang	0.45
Jilin	0.35	Ningxia	0.30	Shanxi	0.39
Inner Mongolia	0.11	Qinghai	0.27	Jiangsu	0.24
Shanxi	0.01	Jilin	0.22	Helongjiang	0.24
Ningxia	-0.05	Guangdong	0.16	Jilin	0.23
Xinjiang	-0.11	Shanxi	0.03	Qinghai	0.15
Guangdong	-0.12	Inner Mongolia	-0.13	Xinjiang	-0.09
Hubei	-0.29	Jiangsu	-0.24	Hubei	-0.10
Fujian	-0.31	Zhejiang	-0.28	Fujian	-0.11
Jiangsu	-0.37	Hubei	-0.28	Shandong	-0.16
Zhejiang	-0.39	Shaanxi	-0.41	Ningxia	-0.17
Gansu	-0.46	Shandong	-0.52	Hebei	-0.39
Shaanxi	-0.48	Gansu	-0.55	Shaanxi	-0.44
Jiangxi	-0.54	Hebei	-0.58	Inner Mongolia	-0.44
Yunnan	-0.56	Fujian	-0.59	Gansu	-0.65
Hebei	-0.59	Yunnan	-0.65	Jiangxi	-0.76
Guangxi	-0.63	Henan	-0.85	Hunan	-0.88
Hunan	-0.68	Guizhou	-0.85	Guangxi	-0.90
Guizhou	-0.75	Hunan	-0.86	Henan	-0.92
Shandong	-0.78	Sichuan	-0.86	Yunnan	-0.92
Henan	-0.92	Guangxi	-0.86	Sichuan	-0.97
Anhui	-0.93	Jiangxi	-0.88	Anhui	-1.09
Sichuan	-0.97	Anhui	-0.94	Guizhou	-1.11

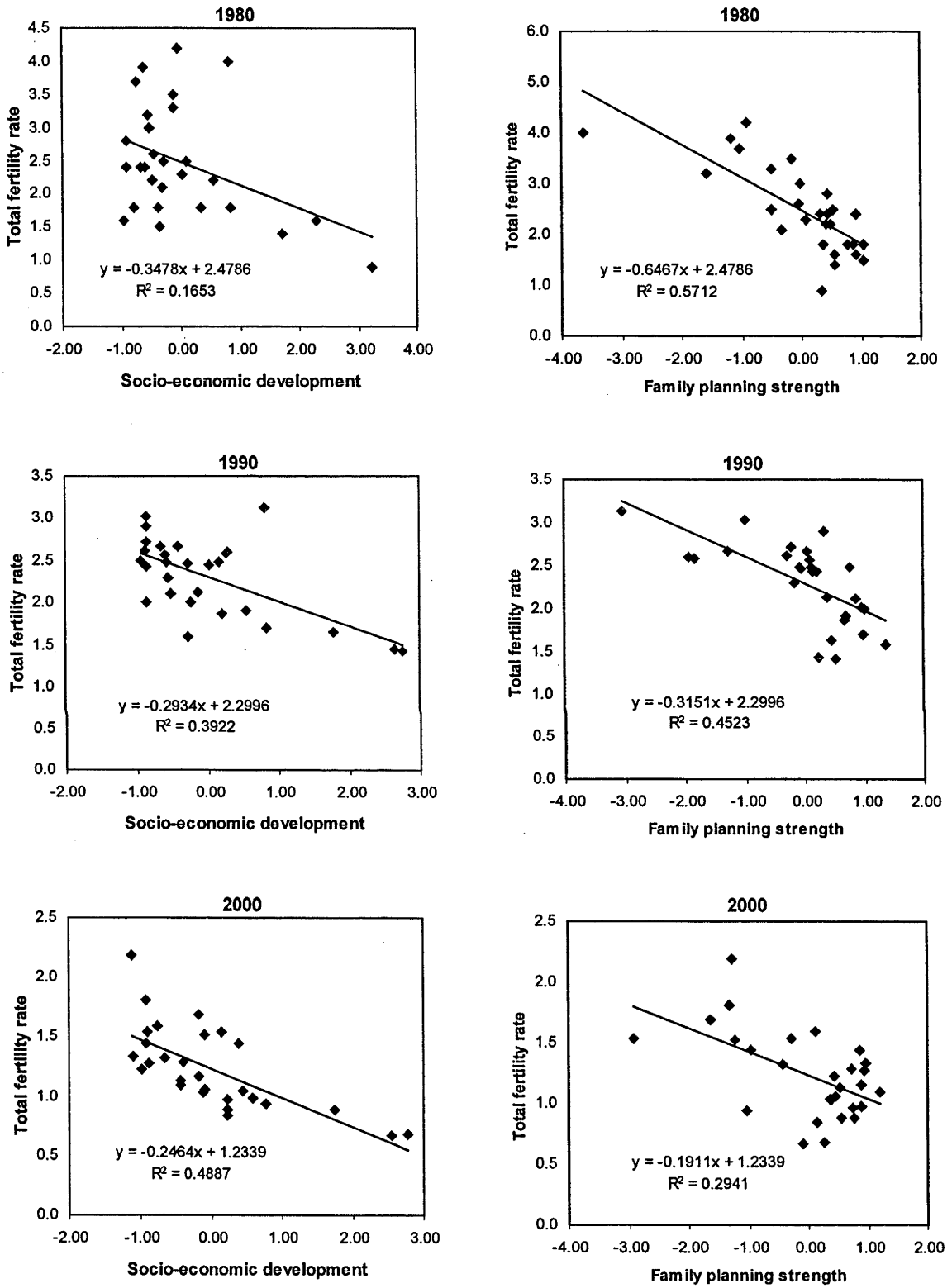
Note: Chongqing, Hainan and Xizang (Tibet) are not included in the analysis because of unavailability of the data.
Source: Table 2.3 and author's own calculations.

Table 2.5 Family planning strength in the provinces of China, ranked by factor score

Province	1980	Province	1990	Province	2000
Shandong	1.05	Zhejiang	1.37	Inner Mongolia	1.21
Jiangsu	1.05	Sichuan	1.01	Anhui	0.95
Sichuan	0.91	Liaoning	0.98	Hunan	0.95
Hebei	0.91	Jiangsu	0.95	Liaoning	0.89
Liaoning	0.86	Shandong	0.86	Shandong	0.89
Jilin	0.77	Hebei	0.76	Henan	0.86
Tianjin	0.56	Helongjiang	0.70	Helongjiang	0.77
Beijing	0.55	Jilin	0.68	Jiangsu	0.74
Hubei	0.53	Shanghai	0.52	Hebei	0.72
Shaanxi	0.48	Tianjin	0.47	Tianjin	0.55
Anhui	0.44	Inner Mongolia	0.37	Shaanxi	0.53
Henan	0.42	Henan	0.33	Hubei	0.46
Helongjiang	0.41	Beijing	0.25	Sichuan	0.43
Zhejiang	0.36	Shanxi	0.21	Zhejiang	0.38
Shanghai	0.33	Hunan	0.14	Fujian	0.36
Hunan	0.32	Anhui	0.13	Shanghai	0.26
Shanxi	0.07	Fujian	0.09	Jilin	0.15
Jiangxi	-0.03	Shaanxi	0.04	Jiangxi	0.13
Gansu	-0.05	Hubei	-0.05	Beijing	-0.11
Guangdong	-0.18	Guangdong	-0.07	Guangxi	-0.30
Fujian	-0.33	Gansu	-0.18	Gansu	-0.42
Inner Mongolia	-0.51	Guangxi	-0.22	Shanxi	-0.97
Xinjiang	-0.51	Jiangxi	-0.28	Guangdong	-1.04
Ningxia	-0.91	Guizhou	-1.00	Xinjiang	-1.22
Guizhou	-1.04	Yunnan	-1.28	Guizhou	-1.28
Guangxi	-1.18	Qinghai	-1.82	Yunnan	-1.32
Yunnan	-1.59	Ningxia	-1.93	Ningxia	-1.65
Qinghai	-3.65	Xinjiang	-3.04	Qinghai	-2.92

Note: Chongqing, Hainan and Xizang (Tibet) are not included in the analysis because of unavailability of the data.
Source: Table 2.3 and author's own calculations.

Figure 2.6 Socio-economic development, family planning and fertility across the provinces of China, 1980, 1990 and 2000



Source: Tables 2.1, 2.4 and 2.5.

Table 2.6 Regression results for total fertility rate against factor scores representing socio-economic development and family planning

	Factors	B	Beta	P	R^2
1980				***	0.735
	Factor 1	-0.356	-0.412	***	
	Factor 2	-0.650	-0.752	***	
	Constant	2.481		***	
1990				***	0.844
	Factor 1	-0.293	-0.626	***	
	Factor 2	-0.315	-0.673	***	
	Constant	2.300		***	
2000				***	0.782
	Factor 1	-0.247	-0.699	***	
	Factor 2	-0.191	-0.542	***	
	Constant	1.234		***	

Note: B=coefficient, Beta=standardized coefficient. Calculated using SPSS 11.0.
Factor 1 represents socio-economic development, Factor 2 family planning strength.
***$p<0.001$.
Source: Tables 2.2 and 2.3.

2.6 Concluding Remarks

China has surprised the world by producing an unprecedented family planning program and rapid economic growth over the past three decades. Both the reproductive regime and the life style of the Chinese people have been fundamentally changed. Within one generation (20 years), the total fertility rate in China dropped from about six children per woman to less than two children per woman. The economic reform has established a favourable context for continued fertility decline, as it has created marked changes in the demand for children and the attitude towards childbearing, and has radically restructured women's economic roles.

China's fertility transition benefited from the tremendous social reform and integration in the first 20 years of the People's Republic. First, mortality reduction in China was as extraordinary as fertility decline. While mortality reduction in the developing world was largely a result of the medical technologies imported from the developed countries, China had hardly taken any advantage of these practices. Mortality decline in China was almost solely a result of institutional change. Life expectancy at birth was only 40 years in the early 1950s; it reached more than 60 years by the early 1970s. The infant mortality rate during this period was reduced from nearly 200 per 1000 births to only

60 per 1000 births (United Nations 2001b). This brought about great potential for fertility decline. The reforms of the society weakened or removed a range of institutional or cultural barriers that favoured childbearing. The most significant of these changes were collectivization and the dying-out of the patriarchal clan system. At the same time, the revolution in socialist ideology made collectivism and obedience to the Party's call a customary practice. The Communist Party successfully used ideology to effect a society-wide mobilization and integration that was unprecedented in scope and depth in Chinese history, creating a kind of social mobilization mechanism rarely seen in other countries. This enabled the government to achieve unprecedented control and to accomplish anything it wished in China. China also achieved marked success in mass education and women's equal access to education and economic participation, which greatly changed the costs and benefits of children along with the traditional value system. Finally, as recent progress in historical demography of China reveals, 'For Chinese, deliberate fertility control has long been within the calculus of conscious choice. China's unusually rapid fertility transition may therefore be attributed to the fact that the Chinese people did not require a change in attitudes, only the establishment of new goals and institutions, along with the diffusion of effective technologies' (Lee and Wang 1999: 96-97).

These explanations imply that the extraordinary fertility decline in China between the 1970s and 1980s contained a large voluntary element, in addition to the much publicized coercive measures. The government was sometimes too ambitious in implementing the one-child policy, which required frequent compromises. With well-established family planning norms and substantial socio-economic transition, fertility underwent a second transition in the 1990s penetrating the below-replacement zone. Despite the fact that there is no consensus on the relative importance of the major causes of fertility decline in China, the analysis using data at provincial level across time demonstrates a dynamic balance between socio-economic development and family planning in determining fertility decline. While both components are important, the family planning program played a dominant role in the first two decades of fertility transition; since 1990 socio-economic development has played a major role in the second fertility transition. The implication is that since all these social factors could only affect fertility through the proximate determinants, induced abortion in China is subject to changes and explanations in a largely similar framework. The long tradition of deliberate birth control in China has much to do with the use of induced abortion.

Chapter 3

Induced Abortion in China: Levels, Trends and Its Role in Fertility Decline

3.1 Introduction

It is well established that China's family planning program has been decisive in the unprecedented fertility decline in the country. While China's family planning program represents one of the most comprehensive and sophisticated packages of policies and regulations, the major technical components involve delaying marriage (and childbearing), use of contraception and remedy of contraceptive failure through abortion. The various national fertility surveys have demonstrably documented the trends in age at marriage and contraceptive prevalence and their significant effects on fertility decline. Yet not much is known about the levels and trends in induced abortion and its role in the fertility decline at the national level. Abortion in China has been a sensitive and controversial issue both within China and around the world regarding its relationship with China's family planning program and fertility decline. Most published China abortion studies have concentrated only on local and small areas, largely cities; and extreme cases and biased reports are part and parcel of the debate. China abortion studies have been constrained largely by the unavailability of data as well as government discouragement.

This chapter addresses two issues surrounding abortion in China: first, what are the levels and trends in abortion in China, measured by a variety of abortion indicators? Second, how important is abortion in China's fertility decline? These issues will also be approached in an international perspective: in what position does abortion incidence in China stand in the international scale? How does abortion change as a component of demographic transition in general, and comparing China with other countries in particular? However, this chapter starts with an overview of abortion policies in China.

3.2 China's Abortion Policies

Abortion has been practised in China since ancient times, simply because 'Life necessitates it' (Tuan 1988: 98). The world's earliest recorded incident of an abortive technique is found in the royal archives of China from nearly 5000 years ago (Bullough 2001). The well-known physician Sun Simiao (AD 581-682) in the Tang Dynasty in his book *Thousands of Important Gold Prescriptions* (*Qian Jin Yao Fang*) quoted abortion techniques from Shen Nong's *Classics of Herbal Medicine* (*Shen Nong Ben Cao Jin*), which is believed to be the earliest Chinese medical book compiled by the Chinese emperor Shen Nong who reigned between 2732 and 2696 BC. (Himes 1970; Tuan 1988). A later supplement to Sun Simiao's book includes 30 volumes with three devoted to gynaecology, and the abortion prescriptions are directed towards pregnant women unable to have a safe delivery because of health impedients or dystocia.

Chinese medical gynaecology developed rapidly in Song Dynasty, leading to the clinical therapeutics. This is well illustrated in the 24-volume *Encyclopedia of Effective Prescriptions for Women* (*Fu Ren Da Quan Liang Fang*), written by the well-known Chinese medical gynaecologist Chen Ziming (1190-1270) in the Southern Song Dynasty. Of particular significance is the inclusion of the heading Studies on Prescriptions of Contraception and Abortion (*Duan Chan Fang Lun*). He revealingly states: '...women have difficulties at the time of childbirth. Some bear offspring unceasingly but desire to stop this; while some nuns and prostitutes do not want to conceive; therefore, prescriptions are written so that they may be prepared for use' (Himes 1970: 110; Tuan 1988: 98; Li Bozhong 2000: 174). Obviously the use of herbal contraception and abortion was extended to meet birth control demands that were previously undesirable, for example, abortion in the cases of too many children or non-marital pregnancies and pregnancy prevention. Also of importance is the method proposed for sex-selective conception indicating the dates during the menstrual cycle for conception of a boy or a girl.

Up to the mid-Qing Dynasty, knowledge of herbal contraception and abortion was fairly widespread in parts of China, particularly in Jiangsu and Zhejiang areas. A famous scholar at that time, Wang Shiduo (1814-1889), termed 'the Chinese Malthus', advocated the spread of prescriptions for contraception and abortion, among other things, to curb population growth (Li Bozhong 2000). Many Chinese medicines have abortifacient effects, and are at all times accompanied by warnings against pregnant women for not taking them.

Induced abortion was prohibited in China in the first half of the 20th century. The Chinese government first made induced abortion a criminal offence in 1910 (Savage 1988), and continued to prohibit it into the early years of the establishment of the People's Republic of China. In 1950, the Ministry of Health of China issued a regulation prohibiting induced abortion for women cadres in government and military departments, and in 1952, the regulation was extended to the whole country, which stipulated that those who underwent sterilization and induced abortion privately would be charged with the crime of illegal abortion, and both the practitioner and the woman would be penalized by the people's court according to the law (Sun 1990). These regulations, however, were for the purpose of protection of maternal and child health by prohibiting contraception, sterilization and induced abortion (Zhai 2000). At that time, induced abortion could only be applied in the circumstances when continued pregnancy was medically undesirable, when child spacing was too dense or breastfeeding of a previous infant was disrupted when it was under four months of age. In such cases, a joint application and consent of the couple and a certification by a physician were required before the abortion procedure. Abortion operations were to be performed as early as possible, preferably within the first month of pregnancy but at the latest not beyond the second month of pregnancy (United Nations 2001a).

However, the 1953 population census surprisingly reported a population figure for China much larger than the government expected. As a result, the abortion-prohibiting regulation was relaxed when there was an initial consideration of a birth control policy (Zhai 2000). Also there were fairly strong demands for abortion and contraception among the cadres in government departments, workers in the factories and other urban residents who were suffering from difficulties and constraints in life, work, study and health due to frequent childbearing as a result of government bans on abortion and contraception, thus wished the government to change its position (Meng and Ma 1999). In August 1953, the central government approved Contraceptive and Induced Abortion Procedures which specifically loosened conditions for induced abortion, mainly for women who already had four to six children (Tien 1987). Among other situations, work or study that was too heavy was specified as a justification for abortions, but any request for the operation had to be first approved by the responsible department and certified by a medical organization. In April 1957, the Ministry of Health issued an announcement further removing the restrictions and making induced abortion available

to women upon request regardless of age or parity (Cui 1981; Sun 1990). In Shanghai, a woman could obtain induced abortion free of charge in any hospital (Savage 1988). However, the liberalized regulations retained stipulations on timing, safety and frequency. Abortions were to be performed within the first trimester of pregnancy, in the absence of other health impediments and when no abortion had occurred in the past 12 months. Women applying for abortion were to be advised of the health risks involved and provided with contraceptive counselling to prevent future unintended pregnancies. The government stressed contraception as the most appropriate preventive measure while abortion was to be the backup measure for contraceptive failure. A major consideration of the Ministry of Health's decision was to eliminate health consequences for women involved in illegal abortions. However, this was also a response to the birth control policy instruction of the Central government issued in 1955, which stated that the Party favoured a birth control policy and Party committees at all levels should publicize the policy among the cadres and the masses, except in the minority nationality areas (Hu 1999). Though there are no statistics to prove it, it is believed that the partly liberalized abortion policy in the late 1950s had a very limited effect on abortion levels in China (Tien 1987; Scharping 2003).

In the aftermath of the Great Leap Forward and economic difficulties, the Chinese government reconsidered the population control policy in 1962 and strengthened their determination to carry out family planning in urban areas. The Ministry of Health further liberalized access to abortion and sterilization. Sterilization could be performed on either spouse of the couple in the absence of any surgical taboos. When a pregnant woman requested an abortion, in the absence of such taboos, it was suggested that the operation should be performed as early as possible, preferably within the first three months of pregnancy. All the procedures were provided free of charge. In addition, there was paid leave for 10-14 days. The Chinese-invented vacuum aspiration technique was first used in Shanghai in 1958, and practised widely in the rest of China after 1964 (Faundes and Luukkainen 1974; Scharping 2003). Unfortunately, although the population policy was still in place, the Cultural Revolution starting in 1966 shifted attention away, and the government ceased all efforts to implement family planning.

The economic breakdown while exceedingly high population growth in the second half of the 1960s compelled the government to install two nationwide demographic programs: the massive migration from urban to rural areas and the resumption of the

family planning program. Unprecedented in scale and thrust, the family planning program has been carried out consistently and vigorously throughout China since the early 1970s, and virtually all the restrictions imposed on obtaining induced abortion were removed. After 1979 China, upon launching the one-child policy, became least restrictive in induced abortion as to both the reason and gestation up to viability (Henshaw 1990; Rahman et al. 1998). Before the family planning policy, the decision to have an abortion was based on the woman's or couple's own consideration to avoid the unwanted birth according to their work, health or childbearing situation. After the family planning policy, however, there were additional interventions from the policy, and induced abortions occurred when the pregnancies were either unwanted or not permitted by the policy. Abortion was not only free but also rewarded. There were variations across China, but generally the women who obtained abortion was rewarded with an extended paid leave and nutritional subsidies, depending on the gestation of pregnancy and whether they used IUD or sterilization after the abortion.

The function of abortion thus changed dramatically between the 1950s and 1980s. Before the 1970s family planning program, abortions in China were purely backup voluntary measures for unwanted pregnancies and were unrelated to any state fertility goals. In the late 1970s, population was integrated into national economic planning. Family planning methods including abortion serve an important role in achieving the demographic goals; this is not common elsewhere. In response, second- or third-trimester abortions, which seldom approved in the earlier years, became more relevant. In many instances, induced abortion became largely obligatory without being left to personal choice. Abortions were applied not only to unauthorized pregnancies but also to non-marital pregnancies. Nonetheless, the government's family planning norms consistently stress abortion as only a remedial measure when there is a contraceptive failure. Repeated abortions and late-term abortions are thought to have grave health consequences and need to be avoided as much as possible. Despite these, induced abortions in China are largely the result of contraceptive failure (Wang et al. 1991; Qiao 2002).

3.3 Levels and Trends

Despite the fact that induced abortion was made legal in China from the late 1950s to the 1960s, approval for induced abortion was limited and strict (Henshaw 1990). Most

pregnant women chose delivery rather than induced abortion and there were no restrictions on the numbers of births at that time.

Since the early 1970s, the number of induced abortions and the abortion rate in China increased with the implementation of the family planning policy, paralleling trends in other birth control methods. Policy adjustments and changes also produced fluctuations in number and rate of induced abortion. Table 3.1 and Figures 3.1 and 3.2 document the levels and trends in induced abortion since China established the nationwide family planning policy.

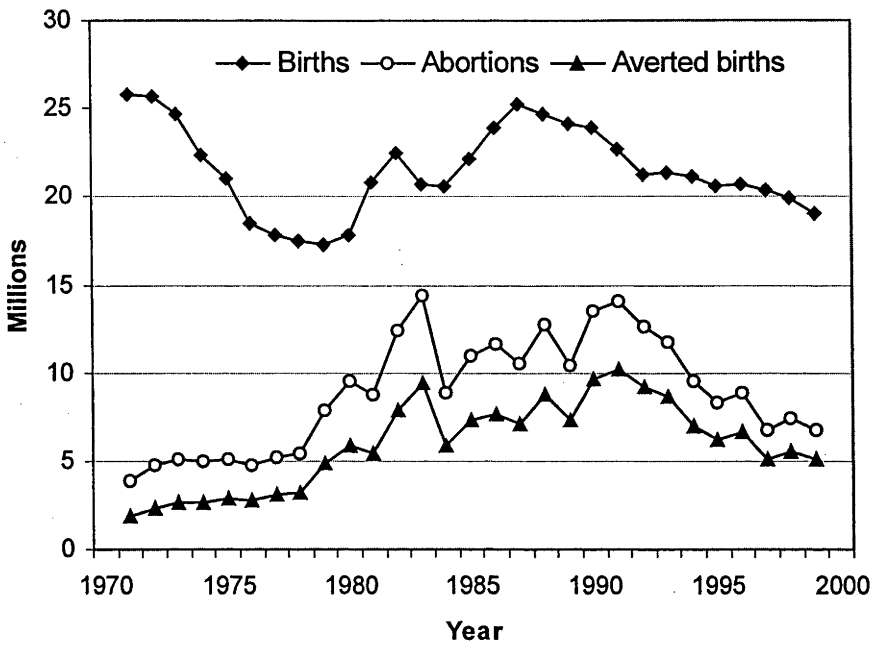
It should be noted that, unlike those in other countries where abortion data in most cases are notoriously underreported, abortion statistics in China tend to be inflated. There are two underlying reasons: first, the abortion data are records of operations performed by the health department, and the records are the basis on which the health department is reimbursed from the family planning department. Thus, both parties are careful and serious about the accuracy of the records. Because money is involved, the health department tends to exaggerate the figures (Tuan 1988). In the fieldwork county, I was also told in an interview with the director of the county family planning commission that the county health bureau invariably overreported the abortion figures to obtain more financial subsidies from the family planning commission (Interview 2002a). The second reason is that the deceptive reporting of family planning statistics involves underreporting of births and overreporting of family planning operations including abortion. The purpose is overtly to gain political honours and monetary rewards (Freedman et al. 1988). However, in the 1990s, 'when illegitimate pregnancies increased and abortions came to be treated as indicators of birth planning failure instead of success, over-reporting may have given way to a tendency to under-report' (Scharping 2003: 122). One of the major indicators measuring the family planning work achievements is late-term abortion. The pressure is not only to reduce the total abortion operations, but also to avert, as completely as possible, late-term abortions (Interview 2002a). These suggest that the actual abortion incidence in China should lie between the high figures from the health department and the low ones from the family planning commission. Abortion data presented in Table 3.1 are those published by the Ministry of Health, implying the possibility of somewhat higher figures than the true levels.

Table 3.1 Levels and trends in induced abortion in China, 1971-1999

Year	Number of births (million)	Number of abortions (million)	Abortion ratio	GAR	TAR	Actual CBR	Expected CBR	Actual TFR	Expected TFR
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1971	25.78	3.91	15.17	20.97	0.63	30.65	32.83	5.40	5.74
1972	25.66	4.81	18.76	25.26	0.76	29.77	32.51	4.93	5.35
1973	24.63	5.11	20.75	26.28	0.79	27.93	30.91	4.51	4.96
1974	22.35	4.98	22.31	25.11	0.75	24.82	27.79	4.16	4.60
1975	21.09	5.08	24.11	25.08	0.75	23.01	26.13	3.58	4.03
1976	18.53	4.74	25.60	22.88	0.69	19.91	22.87	3.26	3.67
1977	17.86	5.23	29.28	24.63	0.74	18.93	22.22	2.87	3.32
1978	17.45	5.39	30.90	24.74	0.74	18.25	21.64	2.75	3.21
1979	17.27	7.86	45.50	35.11	1.05	17.82	22.80	2.80	3.46
1980	17.87	9.53	53.32	40.99	1.23	18.21	24.21	2.32	3.08
1981	20.78	8.70	41.85	36.11	1.08	20.91	26.33	2.72	3.39
1982	22.47	12.42	55.27	49.99	1.50	22.28	30.07	2.62	3.58
1983	20.66	14.37	69.56	56.07	1.68	20.19	29.42	2.39	3.50
1984	20.63	8.89	43.09	33.69	1.01	19.90	25.60	2.29	2.96
1985	22.11	10.93	49.43	40.28	1.21	21.04	27.95	2.32	3.13
1986	23.93	11.58	48.39	41.51	1.25	22.43	29.63	2.36	3.18
1987	25.29	10.49	41.48	36.60	1.10	23.33	29.88	2.47	3.20
1988	24.64	12.68	51.44	43.11	1.29	22.37	30.34	2.17	3.04
1989	24.14	10.38	43.00	34.46	1.03	21.58	28.11	2.29	2.99
1990	23.91	13.49	56.44	43.81	1.31	21.06	29.58	2.24	3.15
1991	22.65	14.09	62.20	44.81	1.34	19.68	28.57	2.20	3.12
1992	21.25	12.58	59.22	39.33	1.18	18.24	26.14	2.00	2.81
1993	21.32	11.75	55.12	36.19	1.09	18.09	25.40	1.83	2.58
1994	21.10	9.47	44.88	28.82	0.86	17.70	23.57	1.81	2.41
1995	20.63	8.28	40.14	25.02	0.75	17.12	22.24	1.78	2.31
1996	20.67	8.83	42.73	26.35	0.79	16.98	22.40	1.81	2.38
1997	20.38	6.79	33.31	20.00	0.60	16.57	20.69	1.82	2.26
1998	19.91	7.38	37.08	21.52	0.65	16.03	20.46	1.82	2.31
1999	19.09	6.76	35.43	19.52	0.59	15.23	19.26	1.80	2.26

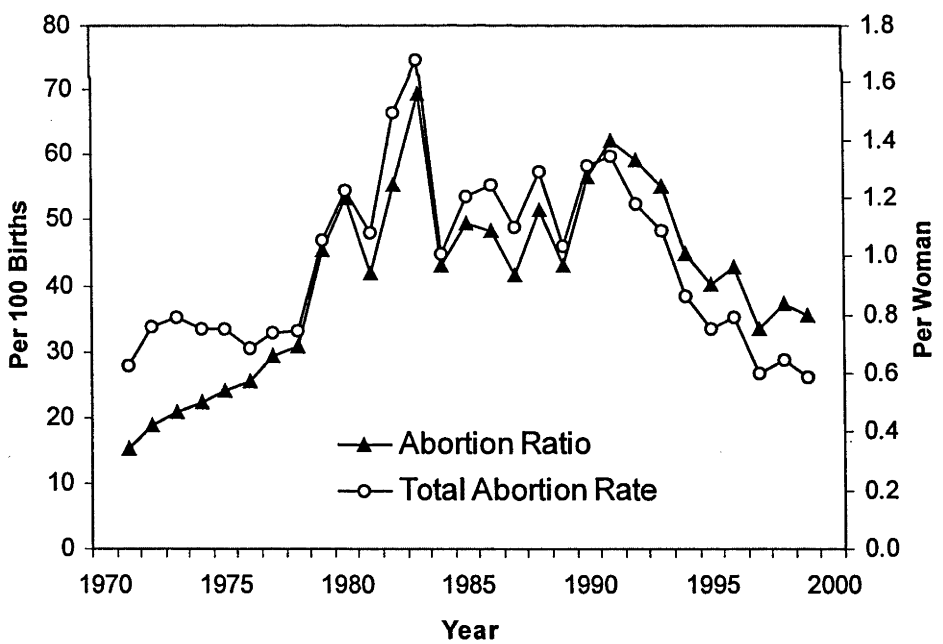
Note: Abortion Ratio=Number of Abortions/Number of Births*100; General Abortion Rate=Number of Abortions/Number of Women aged 15-44 (not shown); Total Abortion Rate is the product of GAR and 30 (women's reproductive span from age 15-44).
Sources: NBS (2000), MOH (2000), Qiao (2002), Coale and Chen (1987), SFPC (2001) and author's own calculation.

Figure 3.1 Trends in number of births and abortions, China, 1971-1999



Note: Averted births=Abortions*0.4*(1+u), where u is contraceptive prevalence rate (see Annex I).
Source: Table 3.1.

Figure 3.2 Trends in abortion ratio and total abortion rate, China, 1971-1999



Source: Table 3.1.

There were no representative nationwide abortion figures before the 1970s. However, a few scattered regional reports indicate that the abortion ratio was well below one abortion per 100 live births in the 1950s. Estimates by Scharping (2003: 121, Table 7) show that there was a steep rise in abortion cases during the second family planning campaign in the early 1960s. Estimated abortion cases were 0.4 million, with the abortion ratio 1.4 abortions per 100 live births, in 1963; in the following two years, the numbers increased rapidly: total abortion cases increased to 1.8 million and the abortion ratio was 6.5 abortions per 100 live births in 1965. The abortion ratio in Shanghai in 1964 was very high at 100 abortions per 100 live births. No data are available for the second half of the 1960s, when bookkeeping broke down in the Cultural Revolution. Consistent figures resume from the early 1970s with the third family planning campaign. In 1971, the abortion number and ratio were already twice as high as those of 1965.

In Table 3.1, abortion levels and trends are represented by four measures: total number of abortions, abortion ratio (AR), general abortion rate (GAR), and total abortion rate (TAR). Number of induced abortions was generally around 5 million before 1979, with the AR below 30 abortions per 100 live births, GAR around 25 abortions per 1000 women aged 15-44 or lower and TAR between 0.7 and 0.9 abortions per woman. This was the period of the 'later-longer-fewer' family planning policy; the policy-set number of children was ideally 2-3 which in fact was the desired fertility at that time. Thus coercion was hardly involved, and contraceptive use and abortion practice increased rapidly when the nationwide network of family planning was established covering the vast majority of the population, and family planning activities were monitored all the way down from the Central government to the grass-roots levels through a highly organized hierarchical administrative system. The total fertility rate dropped by 50 per cent in only seven years, from 5.4 in 1971 to 2.7 in 1978. The most of the Chinese fertility decline occurred in this period when abortion levels were fairly low.

By the late 1970s, the baby-boom cohort born in the early 1960s started to enter the childbearing ages. With the substantial increase in women of reproductive age, vast population growth was inevitable unless a more hastily braking policy was implemented immediately. In 1979, the Chinese government launched the one-child family planning campaign. A set of stringent regulations established the childbearing pattern with respect to whether and when to have a child, and whether and what contraceptive method would be used. Women who had one child must have IUD inserted, women who had two or more children must be sterilized, and women with

unauthorized pregnancies must abort their pregnancies. The extent to which these mandatory measures were enforced reached its highest in 1983; this was manifested in the jump in the abortion level in the early 1980s. The number of abortions doubled and tripled during 1979 and 1983. More than 14 million abortions were recorded in 1983, the magnitude of which was comparable to the 1980 Australian total population (United Nations 2001b: 116). The other abortion indicators also peaked: AR 70 abortions per 100 live births, GAR 56 abortions per 1000 women aged 15-44 and TAR 1.7 abortions per woman (which could mean that a woman would abort 1.7 children in her lifetime at the level of the abortion pattern in 1983). However, fertility was only reduced by a very small magnitude, and throughout the 1980s, fertility was fluctuating well over the replacement level.

Massive resistance within China and increasing criticism from outside China (particularly from the United States) prompted modifications of the one-child policy. No. 7 Document of the Central government in 1984 adjusted the one-child policy, to be known as 'opening up the small hole and closing the big one' (*kai xiao kou, du da kou*) (Peng 1997). Greater flexibility was applied to the circumstances for authorizing the second birth, and coercive and commanding actions in enforcing the family planning policy were prohibited. As a result, slight abortion fluctuations were observed in the next few years but still stood at a fairly high level with AR 40-50 abortions per 100 live births, GAR 30-40 abortions per 1000 women aged 15-44 and TAR 1-1.3 abortions per woman. The policy adjustment revived higher-order births, and the government issued Document No. 13 in 1986 closing some of the loopholes and tightening up the policy (Hardee-Cleaveland and Banister 1988).

In view of political liberalization and social disturbance in the late 1980s, the Chinese government tightened ideological and social control, and in 1991, the Central government issued a decision on strengthening family planning work to strictly control population growth. This was the second round of coercive policy implementation, producing abortion levels similar to those of the early 1980s. This is also believed to be the major force that drove China's fertility below replacement levels in the early 1990s. The heightened efforts in population control were typically characterized by the topmost political leader taking personal responsibility for the family planning performance within his jurisdiction (*di yi ba shou fu zong ze*) and a 'one-vote veto' system (*yi piao fou jue zhi*).

Beginning in 1993, China started to rethink the nature of family planning, proposing to 'grasp the family planning work both tightly and well' (Peng 1997). The 1994 Cairo Conference on Population and Development and the 1995 Beijing World Conference on Women had particular influence on China's family planning. Pilot 'quality-of-care' (*you zhi fu wu*) projects in family planning were set up and carried out in East China, and gradually expanded from an initial six counties to 660 counties (Zhang et al. 1996; Zhang 2000; Zhao 2002). At the same time, the rapid economic development and transition to the market economy also undermined traditional fertility norms. Under these circumstances, the abortion rate declined in the late 1990s. GAR and TAR fell to around 20 abortions per 1000 women aged 15-44 and 0.6 abortions per woman respectively in the last three years, lower than the levels in the early 1970s when the family planning program started.

China's abortion level stood below the world average in the late 1990s; Table 3.2 compares China to a variety of countries in the world. Eastern European countries had the highest level of abortion, where an 'abortion culture' prevails and women rely heavily on abortion to control fertility (Henshaw et al. 1999). Despite marked declines in abortion rates in the 1990s with the availability of modern contraceptives, Eastern European abortion levels are still the highest in the world. In contrast, Western Europe has the world's lowest level of abortion, which is only about one-fifth of the Eastern European level. The many nations of the developing world stand in the middle.

The world average GAR was 35 abortions per 1000 women aged 15-44 and TAR 1.05 abortions per woman in 1999 (AGI 1999). China's 1999 abortion level was lower by a fairly large magnitude. Country differences are striking. In 1996, the highest TAR occurred in Russia and Vietnam where women would abort 2.5 children in their lifetime, while TAR was near-nil in India and South Africa; however, abortion statistics in these two countries are rather incomplete. The peak TAR 1.7 abortions per woman in China in 1983 was actually not only lower than the current highest level in the world but also far below the historical record in the high-abortion countries. Russia, Yugoslavia and Romania, for example, recorded TAR of 5-7 abortions per woman in the early 1960s, and TAR in Japan in the late 1950s was also as high as four abortions per woman (Frejka 1983). Eastern European countries still experienced TARs of 3-4 abortions per woman in the 1970s (AGI 1999). The abortion rate was also climbing quickly in South Korea in the 1970s when rapid fertility decline occurred: TAR in the early 1980s stood at nearly three abortions per woman (Bongaarts and Westoff 2000). It is clear that abortion as a means of fertility control is widely practised around the world,

and it did play a crucial role in fertility decline in some of the rapid-fertility-decline countries. Worldwide experience shows that change in fertility desire and fertility decline frequently outpace the societal response and the availability and provision of the effective methods to achieve the childbearing goals, and in some countries the most rapid fertility decline and the most rapid abortion increase occurred simultaneously. Recently worldwide abortion rates have fallen fairly dramatically as a result of the increasing availability of modern contraceptive methods (Henshaw et al. 1999).

Table 3.2 Comparison between China and selected countries, various abortion measures

Country	Year	Abortion ratio (AR)	General abortion rate (GAR)	Total abortion rate (TAR)
India	1995-96	2.1	2.7	0.08
South Africa	1997	2.4	2.7	0.08
Bangladesh	1995-96	3.1	3.8	0.11
Spain	1996	12.6	5.7	0.17
Netherlands	1996	10.6	6.5	0.20
Belgium	1996	11.2	6.8	0.21
Germany	1996	14.1	7.6	0.23
UK	1996	14.7	10.0	0.31
Japan	1995	22.4	13.4	0.40
Singapore	1996	22.8	15.9	0.48
Sweden	1996	25.2	18.7	0.56
Australia	1995-96	26.4	22.2	0.57
South Korea	1996	24.6	19.6	0.59
USA	1996	22.9	25.9	0.69
Mongolia	1996	18.2	25.9	0.78
China	**1996**	**42.7**	**26.4**	**0.79**
Armenia	1996	39.4	35.4	1.06
Hungary	1996	42.1	34.7	1.07
Latvia	1996	53.9	44.1	1.33
Bulgaria	1996	55.2	51.3	1.55
Yugoslavia	1993	45.8	54.6	1.64
Ukraine	1996	57.6	57.2	1.72
Cuba	1996	58.6	77.7	2.33
Romania	1996	63.0	78.0	2.34
Vietnam	1996	43.7	83.3	2.50
Russia	1996	62.6	68.4	2.56

Source: The China figures are from Table 3.1, figures for other countries are from AGI (1999): Appendix Table 4. Abortion statistics in India, Bangladesh and South Africa 'do not include illegal abortions, which are thought to constitute the majority of procedures' (AGI 1999: 48).

3.4 Contribution of Induced Abortion to Fertility Decline

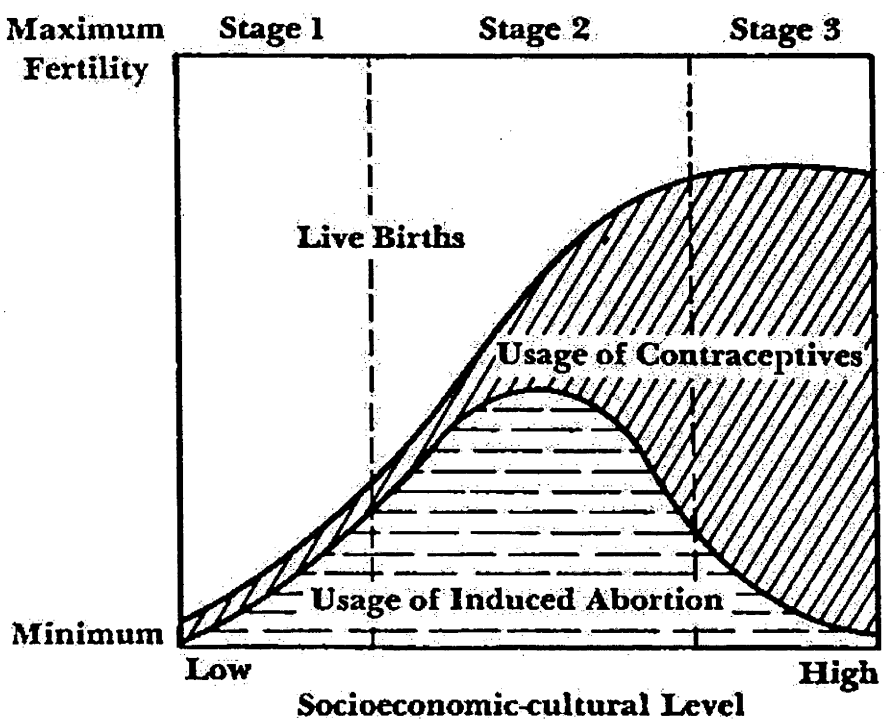
It is widely argued that forced abortion policy is an important component of China's family planning program, and China has relied heavily on induced abortion to control fertility (Feng and Chen 1983; Banister 1987; Aird 1990; Tien et al. 1992; Wang et al. 1998; AGI 1999). Despite the coerciveness, the role of induced abortion in China's fertility decline is far less remarkable than that in many developed and developing countries. We need to examine the trends and patterns in abortion and contraception in relation to fertility transition in China and put Chinese experience in an international perspective.

3.4.1 Induced Abortion and Fertility Transition

Historically and socially contraception and abortion are the two major determinants of fertility decline. The transition of fertility from uncontrolled to replacement-level is seen with varied combinations of contraceptive use and abortion rate. Requena (1965, 1970 cited in Moore 1971 and Potts 1981) proposed a diagram depicting the changing relationship between abortion and contraception in a population with declining fertility. While the fertility transition normally follows an S-shaped curve declining from high to low levels, the abortion rate is an inverted U pattern (Figure 3.3). Over the three stages of fertility transition through which a society may pass, fertility control is normally infrequent in stage 1, as couples desire high fertility ~~desire~~, thus are at little risk of unintended pregnancies. With development, there is a growing gap between actual and desired family size when child survival improves and fertility demand declines. As development proceeds, the desire for reproductive change becomes sufficiently large and widespread that a few innovators adopt contraception, a process that spreads rapidly through diffusion and social interaction (Bongaarts 2002). Thus, as contraceptive prevalence rises and fertility starts to fall, an increasing proportion of couples want no more children, and as a result, the exposure to the risk of unintended pregnancies also increases. In the early and middle stages of fertility transition, use of effective methods of contraception by couples who want to limit or delay childbearing is still far from sustained and universal, largely because of the unavailability of the methods; thus induced abortion rises as well as unwanted births (Marston and Cleland 2003). Thus fertility control is exercised with primary reliance on abortion in stage 2 despite rising contraceptive use. With contraceptive improvement and increasing use of

modern contraceptives, and fertility decreasing toward replacement level, potential demand for abortion and its incidence falls. Thus fertility control shifts its major reliance onto contraception in stage 3. However, when desired fertility is low, potential exposure to unwanted pregnancies becomes prolonged even when women are high users of contraception. Unwanted pregnancies are absent only in societies of 'perfect contraception', societies in which all women who want no more children use 100 per cent effective contraception at all times at risk. Such a perfect state has never been and can never be achieved; a residual demand for abortion always exists, sometimes fairly substantial. More often than not, not all women who want no more children practise contraception and those who do often rely on methods that are far less than 100 per cent effective. The magnitude of abortion in post-transitional populations varies considerably according to their levels of contraceptive use and mix of contraceptive methods. Although both historical and contemporary fertility transitions have generally conformed to the above-described pattern of the changing relationship between induced abortion and contraception, the extent to which abortion versus contraception inhibited fertility varied substantially across countries.

Figure 3.3 Changing patterns of induced abortion and contraception during the fertility transition



Source: Moore (1971). Reprinted with the permission of the Population Council.

Despite the fact that abortion data are notoriously underreported in most countries in the world, so that the role of abortion in fertility decline is difficult to assess in some cases, countries with below-replacement fertility in the late 1990s can be broadly classified into three groups according to the importance of induced abortion in their fertility decline. The first group comprises the Western industrialized countries where fertility transition took place in the 19th century and the early 20th century. Fertility decline in these countries was gradual and cumulative responding to the social and economic changes. The major contributions to fertility decline are the rising age at marriage and proportion not marrying, and use of primarily traditional contraceptive methods, as the highly effective hormonal methods were not developed till the 1950s and 1960s. As fertility transition was largely completed by the time abortion was legalized in the mid-1950s, illegal abortions played some role in fertility decline, but legal abortions play an important role in sustaining low fertility. These countries represented the classical demographic transition model.

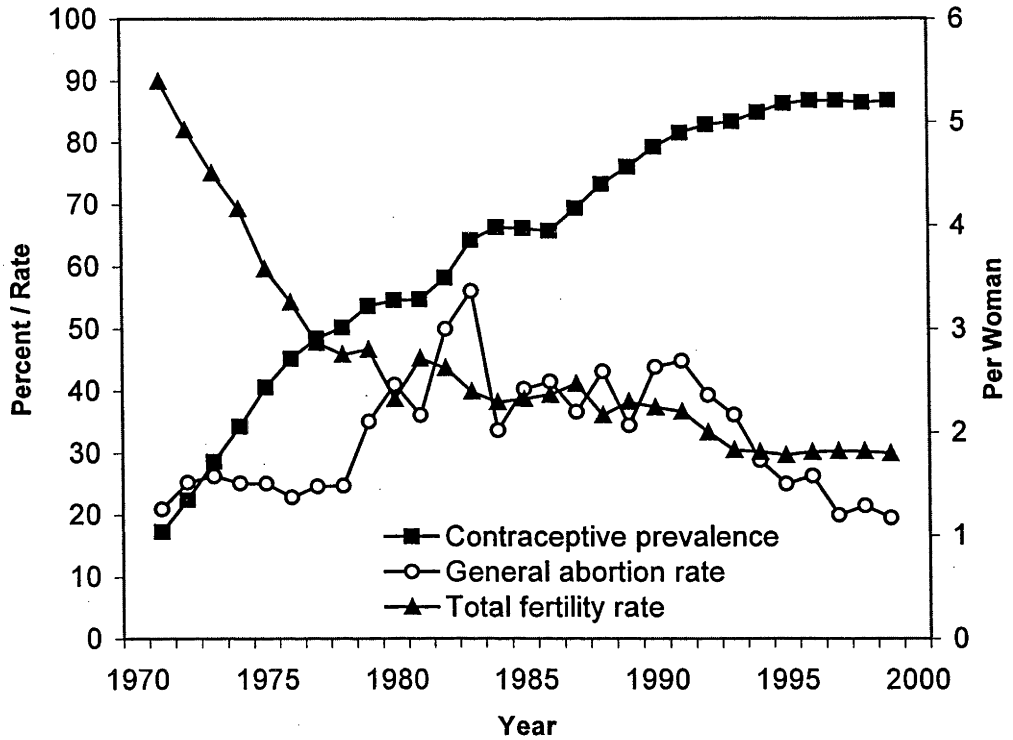
The second group of countries consists of developed areas including USSR and other Eastern European countries and Japan. Fertility transition in these countries largely occurred in the early to mid-20th century within a relatively short period of time. Abortion played a major and decisive role in this rapid fertility decline. Legalization of abortion involved an obviously demographic purpose, and throughout the fertility transition, abortion rates remained the highest in the world. Despite the increasing replacement of abortion by contraception, abortions are still more important than contraception in sustaining low fertility. Finally, the third group comprises populations mainly in East Asia and South-East Asia, such as China, South Korea, Taiwan and Thailand. Fertility transition occurred in these countries in the 1960s and replacement fertility was attained in the late 1980s and early 1990s. Fertility decline has been very rapid under the combined forces of national family planning programs and socio-economic development. While fertility decline was largely due to rising age at marriage and modern contraceptive use, induced abortion played a roughly equal or moderately important role. Unlike the first two group of countries where either technology or policy limited the availability of modern methods of contraception, in the third group of the countries national family planning programs promoted wide use of modern contraceptive methods, and abortion was legalized before or in the early stages of fertility transition. In some of these countries, contraceptive prevalence has reached the highest level in the world, and the role of abortion in sustaining low fertility is

considerably reduced. Across these three groups, abortion has contributed most importantly in the second group, moderately importantly in the third group, and least importantly in the first group to fertility transition and sustained low fertility.

Tietze and Bongaarts (1975) developed some simulation models from which some important conclusions were drawn regarding the incidence of abortion in fertility transition. 'Regardless of its legal status, abortion is used with similar frequency in all countries that have similar patterns of marriage, contraception and fertility' (p.119); and 'it is unlikely that any population has ever attained a low level of fertility (TFR=2.2 or less) without the use of induced abortion, legal or illegal' (p.119). It is amazing from their calculations that even under the best conditions of contraception, fertility control is far from perfect. Assuming that 95 per cent of the couples are limiting family size after two births with contraceptive effectiveness being 95 per cent (abortion is used after contraceptive failure), the total abortion rate will be 0.92 when the total fertility rate is 1.85 (p.116, Table 3). The implication is that with the current contraceptive technology, universal and effective use of contraception will reduce, but will not altogether remove, the need for abortion. Induced abortion continues to play a critical role in family planning and fertility reduction among populations in the early or middle stage of fertility transition.

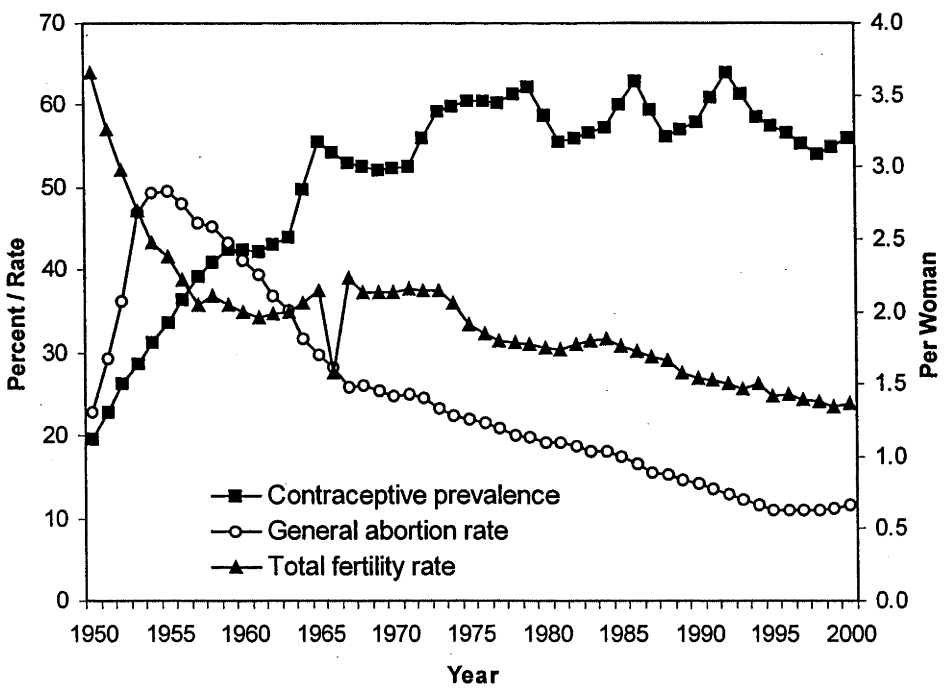
Although available statistics cannot isolate quantitatively the role of induced abortion compared to other fertility-reducing factors for most countries, an attempt is made to quantify the abortion effect in fertility decline in China, with contrast to two neighbouring countries, Japan and South Korea. Figures 3.4 to 3.6 display trends in fertility and its two major determinants, abortion and contraception, in these three countries. There are some similarities as well as dissimilarities between these three countries in their reproductive trends. The general trends in fertility, abortion and contraceptive use are broadly similar: in the initial stage of fertility decline, abortion and contraceptive use increased simultaneously; while at later stages of higher and universal contraceptive use, induced abortion declined when fertility approached the replacement level. However, differences are substantial, primarily regarding the role of abortion.

Figure 3.4 Trends in abortion rate, contraceptive prevalence and total fertility rate, China, 1971-1999



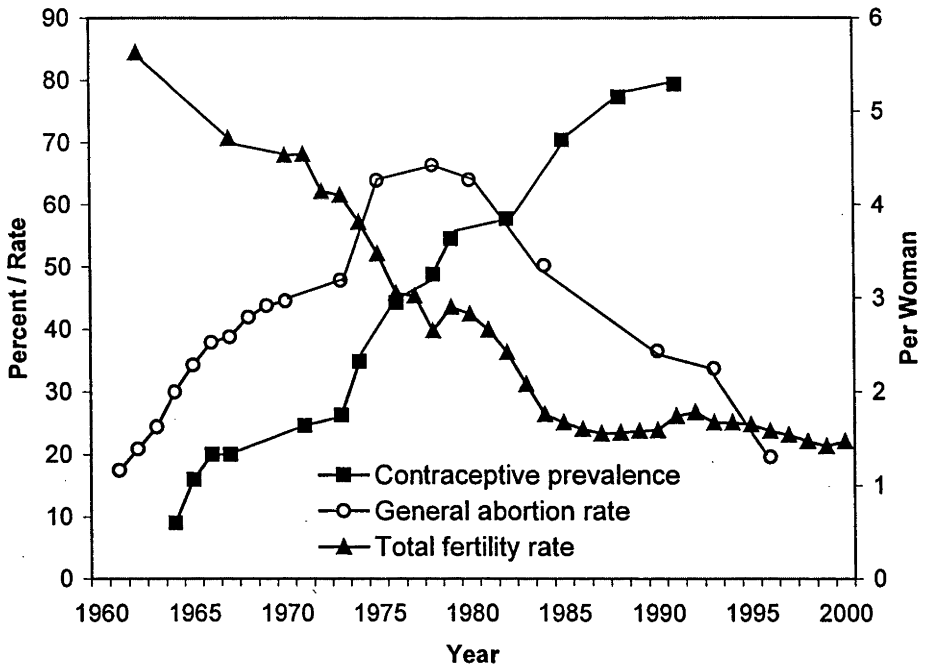
Sources: abortion and fertility rates come from Table 3.1, contraceptive use from the 1988 Two-Per-Thousand Fertility Survey and *China Family Planning Yearbook* for various years.

Figure 3.5 Trends in abortion rate, contraceptive prevalence and total fertility rate, Japan, 1950-2000



Source: Latest Demographic Statistics. National Institute of Population and Social Security Research. http://www.ipss.go.jp/English/S_D_I/Indip.html. Date accessed: 6 August 2003.

Figure 3.6 Trends in abortion rate, contraceptive prevalence and total fertility rate, South Korea, 1960-2000



Sources: Korean National Statistical Office, http://www.nso.go.kr/eng/index.shtml. Date accessed: 6 August 2003; United Nations (1999).

South Korea remains a most striking example of concurrent rise of abortion and contraception with rapid fertility decline. Omran (1971: 481) commented that 'when developing societies are highly motivated to accelerate their transition from high to low fertility, induced abortion becomes such a popular method of fertility control that it becomes a kind of epidemic'. Despite the restrictive abortion law in Korea before 1973, the incidence of abortion rose rapidly along with the increasing use of modern contraception during the 1960s at the initial stage of the national family planning program. Most people were unaware of the illegality (the law was not enforced), and abortion procedures were widely available at both the private clinics and larger institutions. Many social commentators called Korea an 'abortion paradise' (Tedesco 1996) because abortion was easily available and performed hygienically and efficiently at relatively low cost. Social scientists and medical doctors in the late 1950s had raised concerns over the potential consequences of rapid population growth in the wake of post-war economic difficulties. At a time of social disruption, the age at marriage and educational levels were rising, and there was an increasing pressure to control family size, especially in overcrowded urban areas (van der Tak 1974). The small-family norm spread but contraception had not become widely available and acceptable, and the total

abortion rate rose precipitously from 0.5 abortions per woman in the early 1960s to nearly three in the early 1980s. Many women in South Korea used abortion not as a backup for contraceptive failure but as a primary method of birth control, and repeated abortions were common and frequent. The recent two decades have seen marked replacement effects: as contraceptive use increased to over 50 per cent, abortion began to decline, and by the late 1990s the abortion rate had dropped back to its initial level. During this entire period of fertility transition, the total fertility rate dropped from over six to 1.6 births per woman. Abortion-averted fertility rose from 0.6 births per woman in the mid-1960s to a peak of 1.4 in the late 1970s, and then dropped again to 0.6 in the mid-1990s.

While abortions had been fairly widely used in South Korea when the abortion law was still restrictive, the dramatic and extensive resort to abortions in Japan was largely facilitated by liberalization of the abortion law in 1948. In view of rapidly rising numbers of illegal abortions and also for eugenic purposes, Japan moved from strict prohibition of abortion to 'beyond doubt, the most permissive abortion system in the world' by 1952 (van der Tak 1974: 30). Liberalized abortion was also expected to accelerate the desired process of fertility decline.

Liberalization of abortion law in Japan was supported by the widespread social changes, sudden decrease in *per capita* income after World War II and a rapid postwar mortality decline that created high natural increase, which left the Japanese people worried for the first time about overpopulation (Preston 1986). In response, deferred marriage and heavy reliance on induced abortion were adopted to control fertility. As a result, Japanese fertility dropped drastically in just one decade to the replacement level in the late 1950s although use of modern contraceptive methods such as the IUD and pill was largely non-existent. In fact, it seems quite illogical and puzzling that Japanese policies encouraged abortion over contraception. Plastic IUDs were approved in Japan in 1974 but the safer and more effective copper IUDs were not approved until 1999 (Norgren 2001). Japan's long-standing pill ban was extremely unusual: by 1999, Japan was the only member of the United Nations that had not approved the pill for contraceptive use (Norgren 2001). As a result, the primary method of contraception in Japan was the condom. In 1998, condoms still accounted for 78 per cent of all the contraceptive users (United Nations 1999). Compared to the IUD and the pill, the failure rate of condoms is quite high.

Japan provides an example of a fertility transition model in which the intensity of motivation to control fertility in the shortest time possible reached extremes. In the 1950s, fertility decline and abortion rise in Japan were the fastest ever exhibited by an entire nation. While total fertility rate dropped from 4.32 in 1949 to 2.04 in 1959, total abortion rate rose from 0.41 in 1949 to a peak of 1.73 in 1955 and dropped slightly to 1.51 in 1959 according to the official registration system. However, according to Japanese scholars Muramatsu and Koya, the registration was far less complete in abortion statistics. Muramatsu (1973) summarized a range of analyses by Japanese researchers to work out estimates of the real incidence of abortion, which showed that the estimated incidence was about 1.5 to three times as high as the reported incidence. Muramatsu (1970, 1978, cited in Tietze and Henshaw 1986) assumed that two out of every three legal abortions were not reported by physicians, apparently for tax reasons. According to his estimates, as shown in Table 3.3, the actual abortion numbers should be 2.4 to 3.8 times the reported statistics over 1955-1975. While official TAR stood at the highest 1.7 in 1955 and declined thereafter, TAR estimated by Muramatsu exceeded 4.0 in the late 1950s and declined moderately to 2.6 in 1975. Comparison of the last two columns of Table 3.3 shows that abortion-averted TFRs based on Muramatsu's estimates are largely at similar levels to the actual TFRs. Thus, abortion is credited with roughly 50 per cent reduction in the anticipated fertility. The role of abortion in Japanese fertility decline is even larger based on estimates by Koya (cited in Omran 1976), who goes as far as attributing 80 per cent of the reduction to abortion and 20 per cent to contraception.

Table 3.3 Abortion and fertility in Japan, 1955-1975

	Official	Muramatsu's		Total abortion rate		Averted TFR		Actual
Year	statistics	estimates	Ratio	Official	Muramatsu's	Official	Muramatsu's	TFR
	(1)	(2)	(3)=(2)/(1)	(4)	(5)	(6)	(7)	(8)
1955	1170	2790	2.38	1.73	4.13	0.92	2.20	2.37
1960	1063	3150	2.96	1.44	4.27	0.82	2.43	2.00
1965	843	2750	3.26	1.04	3.39	0.65	2.11	2.14
1970	732	2780	3.80	0.87	3.30	0.53	2.01	2.13
1975	672	2250	3.35	0.77	2.58	0.49	1.65	1.91

Note: abortion numbers in columns (1) and (2) are in thousands; Total fertility rate (TFR) or total abortion rate (TAR) are expressed as number of births or abortions per woman.
Sources: Columns (1) and (2) come from Tietze and Henshaw (1986). Column (8) is from Latest Demographic Statistics. National Institute of Population and Social Security Research. http://www.ipss.go.jp/English/S_D_I/Indip.html. Date assessed: 6 August 2003. All other columns are author's own calculations.

Davis (1963) argued that widespread practice of abortion (as well as delayed marriage, increasing contraception and out-migration) was part of a 'multi-phasic response'. 'It is a response to social and economic situations arising in country after country at a particular time in the process of modernization' (Davis 1963: 346). Extensive use of abortion was not peculiarly Japanese, arising out of either ancient tradition in Tokugawa times or the absence of Christian ideology. Such a response was also typical of the most advanced countries of Western Europe. However, the role of abortion was more marked and visible in Japan owing to the legislation and wide availability. Much more important in Japan than in the West at a similar stage of development, and to the achievement of smaller family size, abortion can be considered one cornerstone of the Japanese postwar 'demographic miracle' and 'economic miracle' (van der Tak 1974).

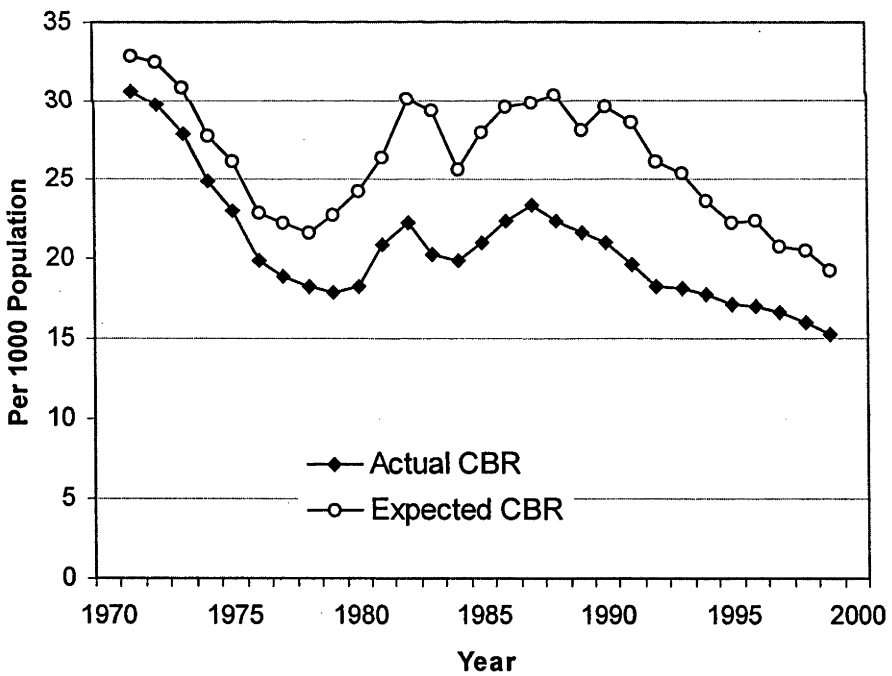
There was a similar response in China soon after the Communist Party took power and launched the modernization drive while rapidly falling mortality created an unusually high natural increase rate of population. There were some initial demands for abortion in the early 1950s when abortion was highly restricted, and in the context of socialism as influenced strongly by the Soviet Union, abortion was theoretically favoured as a socialist approach to the liberation of women (Stycos 1989). At the same time, the Chinese government and policy makers were concerned with the potential consequences of rapid population growth, particularly in the wake of economic difficulties resulting largely from political and policy failure. All these factors contributed to legalization of abortion, and finally with the scale and thrust of the national family planning program abortion became widely practised for limiting and spacing childbearing voluntarily or involuntarily and making up for contraceptive failure.

China's family planning program stressed contraception rather than induced abortion, and the latter was repeatedly described as a 'remedial measure'. However, at the initial stages of the one-child policy when the country's demographic goals were more ambitious then couples' reproductive aspirations, the government promoted induced abortion as well as effective contraceptive methods. Use of abortion and sterilization is particularly associated with the birth quota system and additionally in the 1990s with the 'one-vote veto' system. The pressure to abort and persuaded abortion are evident in

much of China particularly in the rural areas, while in urban areas abortions are increasingly self-motivated.

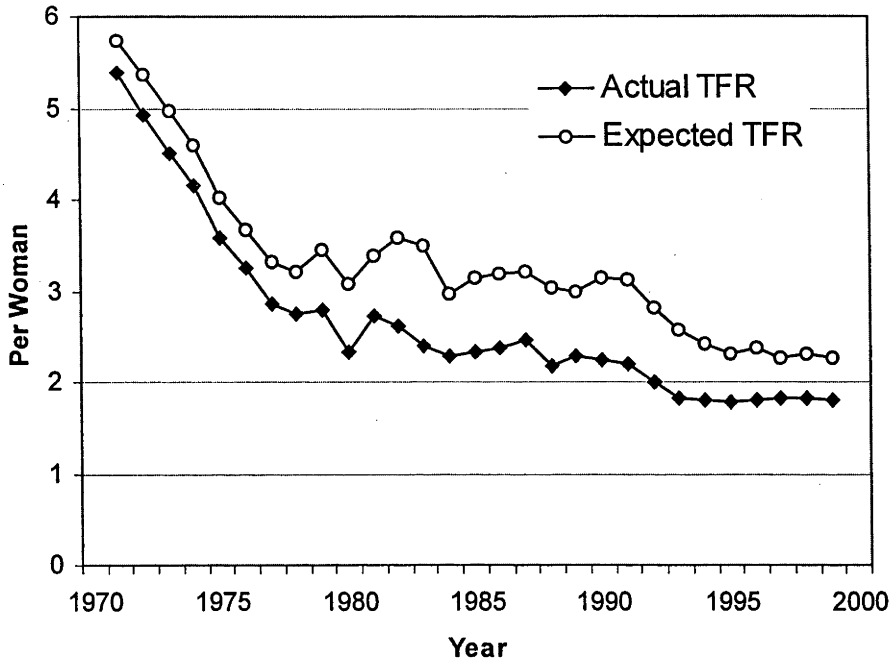
Estimates show that abortion contributed appreciably to fertility decline in China although not as importantly as in South Korea and Japan. Over 1971-1999, the total number of abortions in China was 256.5 millions, implying 172.0 million births averted or 21.6 per cent reduction of the anticipated births (Table 3.1 and Figure 3.1). The effects of abortion on CBR and TFR in China are demonstrated numerically in Table 3.1 (column 6-9) and graphically in Figures 3.7 and 3.8. The gaps between the two curves in both the figures are intuitively the averted fertility by induced abortion. On average, without abortion, CBR would be 3.2, 6.9 and 6.2 per 1000 points higher in the 1970s, 1980s and 1990s respectively; TFR would be 0.4, 0.8 and 0.6 births more per woman respectively.

Figure 3.7 Actual crude birth rate versus expected crude birth rate, China, 1971-1999



Source: Table 3.1.

Figure 3.8 Actual total fertility rate versus expected total fertility rate, China, 1971-1999



Source: Table 3.1.

Despite the less remarkable role of abortion in China's fertility transition when compared with Japan or South Korea, it was often sensationalized out of context. I would argue, regarding Japan particularly, that contraceptive policy had indirectly led to forced abortion (as well as in some Eastern European countries); while in China forced and persuaded abortion are the result of the pressure for meeting the country's demographic goals.

Reference should be made to the differences in China's development and demographic circumstances in contrast to many developed countries during fertility transition. The population base and transitional growth in the European developed countries were much smaller than those of China, and also importantly there was historically a safety threshold—migration overseas—through which population pressure was partly relieved. During the decades-long fertility transition in the developed countries, contraceptive knowledge and methods were gradually developed and diffused, enabling couples to exercise fertility control voluntarily and effectively according to their needs and family circumstances. China, whose population is as big as that of the entire developed world, was immediately in an underprivileged position when launching the

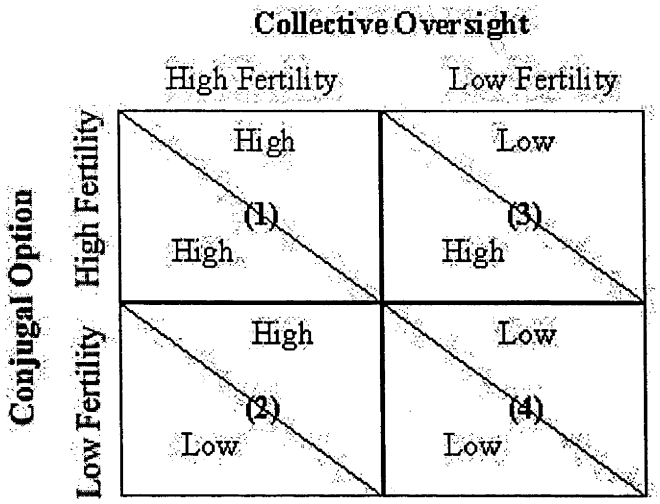
modernization drive with excessively high population growth resulting from rapidly falling mortality. Social, economic and political systems in China required and enabled population planning that differed in nature from the family planning in the West.

Chinese culture and values place collectiveness over individualism. When individual interests are in conflict to collective well-being, the solution favours for the latter. Population planning in China, as well as many other social programs, rests on the notion of advancing collective welfare rather than the narrower idea of individual or family well-being common in the developed countries. Chinese society is also organized in such a way that programs and campaigns geared towards collective well-being can be carried out rapidly and efficiently, sometimes however with heavy human cost. This has been the case over the last 2000 years in general and the past 50 years in particular. The notions of mobilization, education, persuasion and coercion should be understood in the Chinese context, and frequently Western standards do not fit.

Historically in China abortion and infanticide were fairly widely used in hard times, and this contributed to the relatively low marital fertility as compared to the West Europe. In contemporary China, abortion would also increase when couples tried to limit family size in the rapidly changing socio-economic development. Substantial use of abortion in fertility transition is evident in the countries or areas of Chinese culture. However, without the stringent family planning program in China, abortion would not have increased as rapidly as it did, nor would the fertility decline. It is believed that direct policy intervention contributed to more than half of the millions of abortion annually.

As suggested by Tien (Figure 3.9), two fertility frameworks with their changing relationship characterize the fertility transitions, with potentially different implications for use of abortion. In the pre-transition stage, high fertility preference is characteristic of both the collective oversight and conjugal option; subsequent contradictions are largely non-existent. Historically the developed countries went through the fertility transition from (1) to (2) and to (3). When couples started to shift to low fertility option while collective oversight maintained a high-fertility ideology, conflicts resulted. Condemnations, attacks and persecutions of family planning initiators and advocates ensued in the name of religion and morality. Fervent confrontations finally faded away when the two fertility frameworks came to convergence.

Figure 3.9 Paths to controlled fertility



Source: Tien (1987). Reproduced with permission of Sage Publications, Inc.

Unlike the situation in Western countries, the path to controlled fertility in China goes (1)-(3)-(4). Massive resistance ensued when moderately high fertility still dominated couple's preferences while an unprecedentedly rapid shift to very low fertility (one-child policy) at the collective level was made. A new reproductive regime is being established, involving massive applications of contraception and abortion, frequently coercive, in the name of advancing welfare for all in both short- and long-term perspectives. Despite the strong criticisms from the West, this has well characterized the population policy still in much of China today.

China has often been considered extraordinary over the last two to three decades in carrying out the two enormous nationwide social programs: the family planning program and the economic reform. Socialism in the family planning program while capitalism in the economic reform are the major story of their success. The government's determination and the super-capacity of the socio-political system have been fully manifested in the two processes. At the preliminary stage of development, socialism is typically extraordinary; and high (in some instances the world's highest) abortion rates characterize virtually all the former and current socialist countries.

3.4.2 A Decomposition Analysis Using the Bongaarts Model of Proximate Determinants of Fertility

Abortion is one of the four most important proximate determinants of fertility, and as described above, in some countries, it became the principal means for fertility control at times. However, research demonstrates that, contrary to our impression, even in countries with high abortion rates abortion has an impact on fertility that is still much less than that of either contraceptive use or marriage pattern (Frejka 1983, 1985). Only in the cases of extremely high rates of abortion, TAR of three or more, can the fertility-inhibiting effect of abortion rival that of contraceptive use. This only occurred in some of the second group of countries described in the last subsection; while for the countries in the third group where abortion rates were also high by international standards and in China, where it is accused of relying on abortion to control fertility, the effect of abortion on fertility reduction is considerably less than that of delayed marriage and contraceptive use, as will be shown and discussed below.

In this subsection, the Bongaarts model of proximate determinants of fertility is used to analyse the relative and absolute effects of abortion versus other components of fertility in China. According to Bongaarts (1978, 1982) and Bongaarts and Potter (1983), the proximate determinants are a range of biological and behavioural factors that directly affect fertility: the variables through which socio-economic factors must operate to influence fertility. Across the populations, four proximate determinants are primarily responsible for the levels and variations in fertility: marriage, contraception, induced abortion and postpartum infecundability. Nevertheless, other factors are not unimportant. For example, in China, more than 10 per cent of the total population are migrants who largely originated from rural areas to work in the cities; the prolonged spousal separations may reduce fecundability fairly substantially.

In the Bongaarts model, the four proximate determinants shape fertility by reducing the total fecundity rate (TF). They can be considered as fertility inhibitors, to the extent that fertility is lower than its maximum level as a result of the inhibiting effects of delayed marriage (and marital disruption or celibacy), the use of contraception and induced abortion, and postpartum infecundability resulting from breastfeeding or abstinence. Even under so-called natural fertility regimes, these behavioural factors can reduce TF

substantially. The relationship of these four proximate determinants and fertility is expressed as follows:

$$TFR = C_m \times C_c \times C_a \times C_i \times TF$$

where C_m, C_c, C_a and C_i are indices representing the four proximate determinants, respectively, that is, the fertility-inhibiting effects of marriage, contraception, abortion and infecundability. The range in value of the indices is from 0 to 1 where 0 indicates a complete and perfect fertility-inhibiting effect, and 1 means such an effect is totally non-existent. The lower the value of any index, the greater its fertility-reducing effect, as the index value expresses the fertility anticipated under the observed levels of the proximate determinants as a proportion of the maximum fertility when any fertility-inhibiting effect of the determinant is absent. Thus the complement of each index value indicates the proportionate reduction of fertility attributable to that proximate determinant, permitting comparison of the relative importance of the different determinants and their absolute contributions as well.

The determinants of each index are as follows (Bongaarts 1978; Frejka 1985). C_m: the two factors determining the value of the index of marriage are the average time a woman spent within marriage thus exposed to the risk of conception and the life cycle stage in which a woman lives. Marriage patterns have a pronounced effect on the C_m value. Early and universal marriage and low incidence of divorce and widowhood will generate C_m values of 0.7-0.8, while late and less universal marriage and high divorce rates will generate C_m values of 0.4-0.5. However, the Chinese population is still characterized by universal marriage and very low divorce rate, but has a very low C_m value. For example, according to the 2000 population census, the C_m value in 2000 was only 0.40. Such a low value is largely a result of delayed marriage.

C_c—the index of contraception—is determined by the contraceptive prevalence rate and the mix of contraceptive methods which determines contraceptive effectiveness. If few practise contraception and if ineffective methods are used, C_c value can be over 0.9; however, extensive and widespread use of modern methods can lead to a C_c value as low as 0.2. China has the world's highest contraceptive prevalence rate, and the majority of the contraceptors use IUD and sterilization. However, contraceptive effectiveness in China is fairly low. According to a study (Wang and Weng 1990) on

contraceptive effectiveness using the 1988 fertility survey data, largely as a result of low effectiveness (low quality and high failure rate) of the IUD and pill, the overall contraceptive effectiveness is estimated to be only 0.76. Applying the US method-specific effectiveness to the Chinese mix, the overall effectiveness would stand as high as 0.96. Despite China's low C_c value, improvement in effectiveness could still greatly reduce the value.

The index of abortion, C_a, is mainly determined by total abortion rate, and the functional relationship between C_a and TAR is negative. However, an induced abortion cannot avoid one live birth, because a pregnancy terminated by an abortion occupies a much shorter duration than does a full-term pregnancy in the reproductive span; but the abortion effect is strongly influenced by use of contraception following the abortion. It is estimated that 0.4-0.8 births can be averted by an induced abortion depending on the prevalence and effectiveness of contraception (Potter 1976). In China, an induced abortion is estimated to have averted, on average, 0.6-0.7 births over the last two decades.

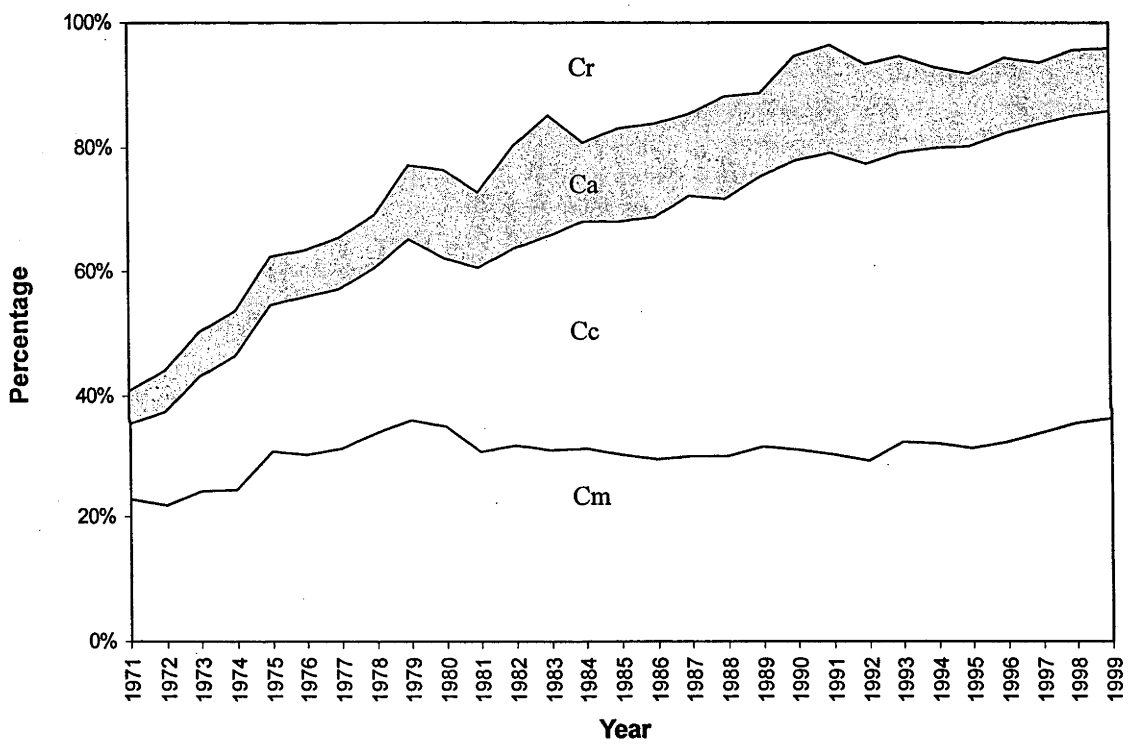
C_i, the index of postpartum infecundability, is primarily determined by the duration of breastfeeding. From traditional to modern populations, the index value ranges from 0.5-0.9. Breastfeeding in China has been dramatically shortened over the last three decades, particularly in urban and the more developed rural areas; thus its effect on fertility has been considerably reduced. However, owing to lack of annual time-series data, C_i is not calculated directly according to the formula proposed by Bongaarts, but rather as a residual of the Bongaarts model. Hence, C_r is used to substitute for C_i, capturing all other factors including postpartum infecundability.

Table 3.4 presents results of the Bongaarts model as applied to China. Figure 3.10 displays the relative importance of the proximate determinants in fertility reduction. Technical details for these calculations are presented in Annex I.

Throughout the entire period under examination, as shown in column 1-4 of Table 3.4 and Figure 3.10, marital patterns and contraceptive use were more important fertility-modifying factors than abortion. Before 1978, the largest fertility-inhibiting factor was postpartum infecundability or other components of the residual factors represented by

C_r. Since China began the one-child policy in 1979, widespread use of contraception and delayed marriage have been exerting increasingly greater influence on fertility. In the 1970s, China's family planning policy was 'later-longer-fewer'. Delayed marriage, which contributed to reduction of fertility by 23 per cent in 1971 to 48 per cent in 1979, had the second largest fertility reducing effect; while abortion had a minor effect, reducing fertility by less than 20 per cent. Less than 40 per cent fertility reduction came from contraceptive use, and 40-50 per cent from the residual factors.

Figure 3.10 Relative contribution of the proximate determinants to reduction of fertility from total fecundity, China, 1971-1999



Source: Table 3.4.

Table 3.4 Proximate determinants of fertility in China, 1971-1999

Year	Cm	Cc	Ca	Cr	Actual TFR	Expected TFR in the absence of			Difference between expected and actual TFR					
									Absolute			%		
						Cm	Cc	Ca	Cm	Cc	Ca	Cm	Cc	Ca
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1971	0.77	0.87	0.94	0.51	5.40	7.02	6.22	5.74	1.63	0.83	0.34	30.16	15.32	6.36
1972	0.76	0.83	0.92	0.50	4.93	6.47	5.96	5.35	1.55	1.03	0.43	31.38	20.93	8.68
1973	0.73	0.78	0.91	0.52	4.51	6.21	5.78	4.96	1.71	1.27	0.46	37.89	28.26	10.13
1974	0.71	0.74	0.90	0.52	4.16	5.87	5.65	4.60	1.72	1.49	0.44	41.39	35.89	10.65
1975	0.62	0.69	0.89	0.56	3.58	5.77	5.20	4.03	2.20	1.63	0.45	61.41	45.47	12.71
1976	0.61	0.65	0.89	0.55	3.26	5.35	4.99	3.67	2.10	1.74	0.42	64.51	53.35	12.88
1977	0.57	0.63	0.86	0.54	2.87	4.98	4.57	3.32	2.12	1.70	0.45	73.93	59.37	15.87
1978	0.54	0.61	0.86	0.57	2.75	5.09	4.48	3.21	2.34	1.73	0.46	85.27	63.00	16.63
1979	0.52	0.59	0.81	0.66	2.80	5.33	4.77	3.46	2.53	1.97	0.66	90.50	70.33	23.47
1980	0.50	0.58	0.75	0.62	2.32	4.64	4.00	3.08	2.32	1.68	0.76	100.19	72.39	32.69
1981	0.57	0.58	0.80	0.60	2.72	4.77	4.69	3.39	2.06	1.97	0.67	75.73	72.71	24.80
1982	0.55	0.55	0.73	0.69	2.62	4.75	4.74	3.58	2.13	2.12	0.96	81.30	81.08	36.56
1983	0.55	0.51	0.68	0.74	2.39	4.38	4.73	3.50	1.99	2.34	1.11	83.01	97.70	46.17
1984	0.53	0.48	0.77	0.68	2.29	4.28	4.78	2.96	1.99	2.49	0.67	86.93	108.85	29.34
1985	0.55	0.47	0.74	0.71	2.32	4.23	4.95	3.13	1.91	2.62	0.81	82.13	112.89	34.82
1986	0.56	0.46	0.74	0.73	2.36	4.23	5.13	3.18	1.86	2.77	0.81	78.83	117.10	34.40
1987	0.56	0.44	0.77	0.75	2.47	4.40	5.57	3.20	1.93	3.10	0.73	77.94	125.51	29.45
1988	0.54	0.42	0.71	0.78	2.17	4.02	5.11	3.04	1.85	2.95	0.88	85.58	135.96	40.48
1989	0.53	0.42	0.77	0.80	2.29	4.31	5.53	2.99	2.01	3.23	0.70	87.80	140.86	30.31
1990	0.54	0.39	0.71	0.90	2.24	4.19	5.82	3.15	1.95	3.57	0.90	86.85	159.27	40.27
1991	0.54	0.37	0.70	0.93	2.20	4.08	5.99	3.12	1.88	3.79	0.92	85.53	172.27	42.03
1992	0.54	0.36	0.71	0.86	2.00	3.72	5.61	2.81	1.72	3.61	0.81	86.22	180.51	40.60
1993	0.49	0.35	0.71	0.88	1.83	3.75	5.20	2.58	1.92	3.37	0.75	105.10	184.38	40.88
1994	0.49	0.34	0.75	0.85	1.81	3.69	5.31	2.42	1.88	3.50	0.61	104.13	193.17	33.49
1995	0.50	0.33	0.77	0.83	1.78	3.59	5.40	2.31	1.81	3.62	0.53	101.84	203.13	29.72
1996	0.49	0.33	0.76	0.88	1.81	3.72	5.54	2.38	1.91	3.73	0.57	105.52	206.05	31.37
1997	0.47	0.33	0.80	0.87	1.82	3.87	5.58	2.26	2.05	3.76	0.44	112.60	206.33	24.22
1998	0.45	0.33	0.79	0.91	1.82	4.00	5.53	2.31	2.18	3.71	0.49	120.00	203.73	26.66
1999	0.45	0.33	0.80	0.91	1.80	4.04	5.51	2.26	2.24	3.71	0.46	124.26	206.03	25.32

Sources: Table 3.1 and Figure 3.4, and author's own calculations.

In the 1980s, the effect of delayed marriage was slightly reduced and fluctuating as a result of the enforcement of the Marriage Law in 1980 which reduced the *de facto* legal age at marriage, the effect of the 1960s baby-boomers reaching marriageable ages, and relaxation of the family planning policy. However, delayed marriage still accounted for 44-47 per cent of the fertility reduction, compared with 23-32 per cent of the reduction attributable to induced abortion. Contraceptive use had the greatest effect, with 42-58 per cent fertility reduction. The effect of abortion and effects from the residual factors were largely similar. In the 1990s, while continued improvement in contraceptive use constituted the greatest fertility reduction, by over 60 per cent to nearly 70 per cent, the shift to further delay in marriage reduced fertility by 50 per cent or more. However, as the abortion rate declined, its effect decreased to 20 per cent in the late 1990s. Over the entire period, even in 1983 and 1991, the years of highest abortion number and rate, the effect of abortion was still two-thirds that of delayed marriage and contraceptive use: a 30-32 per cent reduction in fertility compared with a 45-60 per cent reduction.

Columns 6-14 of Table 3.4 present the absolute effect of abortion on fertility in contrast to that of other proximate determinants over the period under study. In calculating these effects, expected TFRs are computed by dividing the actual TFRs by the respective indices; the difference between the expected TFRs and actual TFRs represents the absolute effect of each of the proximate determinants. While columns 8, 11 and 14 illustrate a substantial absolute effect of abortion on fertility, other columns show much greater, often 3-5 times and recently 6-8 times greater, absolute effects from delayed marriage and contraceptive use. Without abortion, fertility would still have declined fairly rapidly by international standards; however, in the absence of contraceptive use, Chinese fertility would be very high, at pre-transitional or early transitional levels (TFR of 5 or over), throughout most of the period. If marriage patterns did not change, TFR would have been around 4-5 since the late 1970s. In the late 1990s, removal of abortion would have raised TFR to slightly above the replacement level (in fact, according to the highly skewed sex ratio at birth in China, replacement level fertility in China is calculated to be 2.3; thus removal of abortion would raise TFR up to the replacement level); however, in the absence of marriage postponement or contraceptive use, TFR would be doubled or tripled.

An issue of considerable interest is the role of abortion in fertility decline over the period under study. TFR in China dropped from 5.4 in 1971 to 2.8 in 1979, 2.3 in 1989

and 1.8 in 1999. How important was abortion compared to other proximate determinants in these fertility decreases? Table 5 shows the comparative results through a decomposition analysis of the decadal change in TFR. The decomposition formulas were developed by Casterline et al. (1984) and Singh et al. (1985).

Table 3.5 Decomposition of the change in TFR in China, various periods

Period	Cm	Cc	Ca	Cr	Total
		% change in TFR			
1971-79	-27.93	-28.61	-10.94	19.38	-0.48
1979-89	1.29	-31.42	-4.89	16.97	-0.18
1989-99	-15.75	-21.26	3.46	11.99	-0.22
1971-99	-33.02	-59.25	-9.96	35.60	-0.67
		Distribution of % change in TFR			
1971-79	58.07	59.48	22.74	-40.28	100.00
1979-89	-7.17	174.10	27.08	-94.02	100.00
1989-99	73.07	98.61	-16.07	-55.61	100.00
1971-99	49.56	88.92	14.94	-53.42	100.00
		Absolute change in TFR			
1971-79	-1.51	-1.54	-0.59	1.05	-2.60
1979-89	0.04	-0.88	-0.14	0.48	-0.51
1989-99	-0.36	-0.49	0.08	0.28	-0.49
1971-99	-1.78	-3.20	-0.54	1.92	-3.60

Source: author's own calculations based on Table 3.4.

Table 3.5 indicates that TFR declined by 48 per cent over 1971-79, 18 per cent over 1979-89 and 22 per cent over 1989-99. Over the entire period under study, TFR declined by 67 per cent. Or in absolute terms, TFR dropped by 2.6, 0.5 and 0.5 births per woman, respectively, during 1971-79, 1979-89 and 1989-99. A total decline of 3.6 births per woman was observed over the entire period. These proportional and absolute declines in TFR are decomposed into the various components representing the contribution from the proximate determinants. For example, the TFR decline of 48 per cent between 1971 and 1979 is decomposed into a 28 per cent decline due to delay in marriage, a 29 per cent decline due to increase in contraceptive use, an 11 per cent decline due to increase in practice of induced abortion, and a 19 per cent increase due to shortening of the duration of postpartum infecundability or some other factors. The middle panel of Table 3.5 contains decomposition results standardized to add to 100 per cent, while the lower panel indicates that, for the period from 1971 to 1979, a decline of 2.6 births per woman is made up of a decline of 1.51 births per woman due to marriage

postponement, a decline of 1.54 births per woman due to contraceptive improvement, a decline of 0.59 births per woman due to increased recourse to induced abortion, and an increase of 1.05 births per woman due to other factors, such as changing breastfeeding and other proximate factors.

The decomposition is based on a start and an end point of the periods, without taking into account the changes in the intermediate years. Nevertheless, the results reveal importantly, in a comparative manner, the role of various proximate determinants (or the various components of the family planning program in China) in Chinese fertility decline. Over the entire period, and every decade as well, fertility decline in China was achieved mainly through control over marriage and contraceptive use, or preventive methods rather than the remedial measure, abortion. Contraceptive use is the most important factor, followed by later marriage and practice of induced abortion. Other factors only work in the opposite direction. It is clear that in China, over the period 1971-1999, over 70 per cent of the fertility decline occurred in the 1970s before the one-child policy, largely through later marriage and limiting and spacing childbearing using modern contraceptives. The coercive nature of the one-child policy including forced or persuaded abortion contributed much less importantly to the rapid fertility decline in China.

3.5 Concluding Remarks

China is one of the countries with the least restrictive abortion laws that permit abortion without restriction as to reason (Rahman et al. 1998). The changes from the total ban on induced abortion in the early 1950s to successive legalization from the mid-1950s leading quickly to a completely liberalized abortion policy are associated with both the changing socio-economic circumstances and the development of the population control policy.

China's birth control campaigns were motivated by a perceived need to cope with the urgency of population pressure when modernization appeared to be a distant dream. The rapidly growing population during the 1950s and 1960s was seen as a huge obstacle to China's social and economic development, while the pressing and ambitious goal of quadrupling GNP per capita within 20 years set by the reform and opening up policy in the late 1970s entailed slowing-down of population growth as early and to the

greatest extent possible. The later-longer-fewer birth control policy since the early 1970s was transformed into the one-child policy in 1979. The government targeted the total population of China to be 1.2 billion by year 2000 with zero growth rate (these demographic targets were later adjusted upward). Since the policy requirement on the number of births per couple was far below the societal preference at that time, forceful and coercive means of birth control were widely adopted to achieve the demographic targets. Family planning operations including induced abortion increased sharply. Before the start of the one-child policy in 1979, there were about 5 million abortions annually in China; however, the number rapidly climbed to nearly 10 million in 1980, and stood well over 10 million per annum throughout most of the time from the 1980s to the mid-1990s. Since 1993 and particularly with the influence of the 1994 ICPD, China's family planning program was reformed with two transitions, that is, transition of its work philosophy and transition of the work methods. In 1995, a pilot quality-of-care project was carried out in East China, which was extended to 660 counties (25% of China's total counties and characterized typically by low fertility and high abortion) throughout the country by 2000. Quality of care focused on informed choice of contraceptive methods, elimination of birth quotas, reproductive health care throughout the life cycle, and prevention of order and coercion in family planning work. As a result, induced abortions in China have fallen sharply since the mid-1990s.

The number of induced abortions in China is by far the largest in the world, but when translated into terms relative to population, China's abortion rate was well below the world average in the late 1990s. The highest TAR ever for China of 1.68 occurred in 1983, but this figure was not only far lower than the levels in Eastern European countries accommodating the world's highest abortion rates, but also much lower than the highest levels once reached in East Asia's other rapidly-declining-fertility countries. Compared with the two neighbouring countries South Korea and Japan, the role of abortion in China's fertility decline was moderate. In the 1970s and 1980s when Korean fertility was dropping rapidly, abortion averted between 1 and 1.4 births per woman. More dramatically in Japan, from the 1950s to the 1970s, fertility would have doubled if abortions were removed. In contrast, in China even in the peak abortion periods, total fertility averted by abortion was about 0.8 births per woman.

The view that China's family planning program relies heavily on induced abortion is further undermined by the illustration of the Bongaarts model of the proximate

determinants. When fertility reduction was decomposed into the various contributions from the proximate determinants, both the extent to which fertility is inhibited from its biological level and the extent to which fertility is brought down from a pre-transition to a low level as a result of recourse to abortion are far less drastic than that from either marriage postponement or contraceptive use. The abortion role is only a third to a fourth of the importance of the other two components. In fact, research shows that only very high abortion rates, for example, the abortion rates observed in USSR, Romania and Japan in the 1950s and 1960s, can override the fertility-reducing effects of non-marriage and contraceptive use. Unlike those high-abortion countries, China throughout the fertility transition vigorously promoted and placed priority on preventive measures and made the modern contraceptive methods universally available and free of charge. Most of the Chinese fertility decline occurred in the 1970s when abortion played a minor role. However, abortion did importantly delete the millions of unauthorized pregnancies or pregnancies resulting from contraceptive failure in the post-one-child-policy period. It is believed that a two-child policy instead of the one-child policy would well reduce the incidence of abortion while the fertility attained would be largely similar.

Fertility and abortion levels have never been uniform across China. Even if the family planning policy applied equally to all the segments of the society, diversity remains a hallmark of the abortion patterns across the social strata experiencing different socio-economic circumstances and family planning norms. In the next chapter, socio-economic and regional patterns of abortion are examined using the 1997 survey data.

Chapter 4

Patterns and Characteristics of Induced Abortion in China

4.1 Introduction

Despite the fact that China has forcefully and effectively implemented the world's most stringent family planning program which reached all sectors of the population, fertility differentials across regional and local areas vary substantially. A commonly held view that 'China's demographic changes have been uniform results of a completely monolithic family planning program' (Poston and Yaukey 1992: 330) has been repeatedly disputed by both Chinese and foreign scholars who have documented and explained fertility patterns and variations. The vast population of China itself potentially generates great diversity in human behaviour.

Tremendous changes have taken place in all aspects of Chinese society over the last three decades. The fundamental characteristics of pre-reform socialist China have been amended, affecting significantly the implementation and shifts of the population policy and reproductive behaviour. The more divergent regional development and more localized family planning regulations have created greater variability in fertility norms and patterns. As an example, one of the noticeable trends is the increasing spread and intensity of non-marital sex and abortion. If the one-child policy was the overarching determinant of abortion in the 1980s, the recent decade has seen increasing proportions of procedures attributed to socio-economic factors.

The incidence of abortion in China observed in the preceding chapter thus belies considerable disparities between subregions and socio-economic groups of the population. In addition to the contextual values surrounding abortion as expressed in laws, policies and mores, abortion practice is influenced by demographic characteristics of the women, such as age, parity, sex composition of the children, marital status, and contraceptive use, and their socio-economic and cultural attributes, such as place of residence, education, income, ethnicity, and religion (Tietze and Lewit 1981). Drawing on data from China's 1997 National Demographic and Reproductive Health Survey (1997 NDRHS), this chapter examines the extent to which induced abortion is differentially used by women of varying socio-demographic and economic

characteristics in China, with international comparisons when applicable. But first, regional patterns are analysed using both the family planning statistics and fertility survey data.

4.2 Regional Variations

4.2.1 Urban-Rural Differences

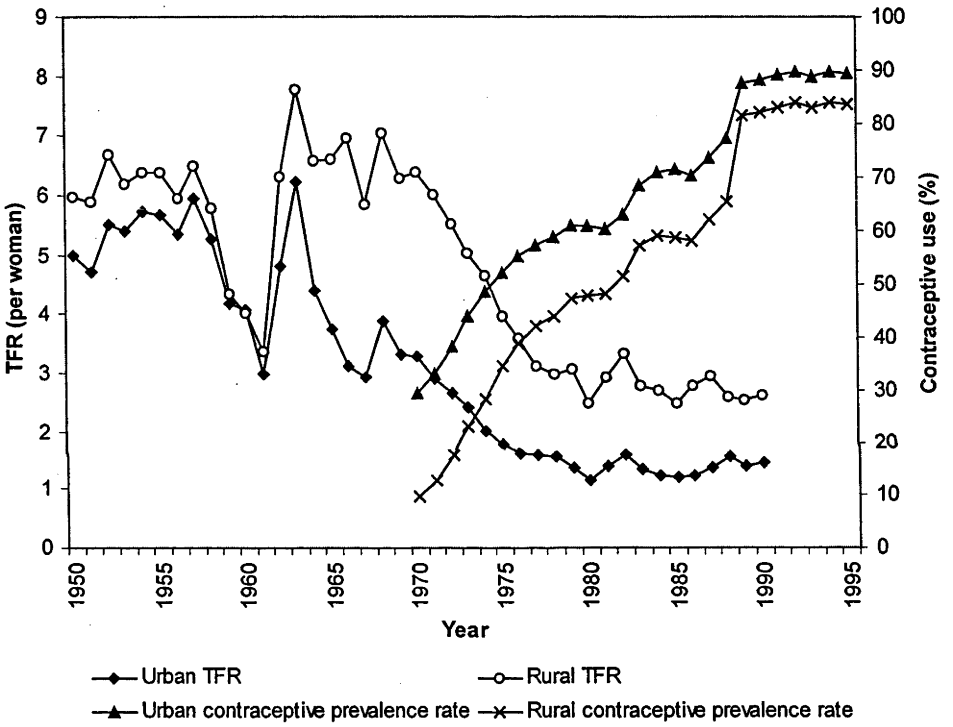
China is typically characterized by a dualistic socio-economic structure, in which development in the whole range of socio-economic environments has been very uneven between the urban and rural areas. The urban-rural developmental gap has been widening since China initiated the reform and open door policy. On the other hand, family planning policy has been applied and implemented differently to urban and rural populations as a result of the different policy requirements and administrative management systems. Under these circumstances, patterns of fertility decline and variations in the proximate determinants have been in marked contrast between the two sectors.

Figure 4.1 displays the total fertility rate (TFR) and contraceptive rate for urban and rural China over the last five decades. It is important to note that rural predominance is characteristic of China's population development. Despite the changing and complicated definitions of urban and rural areas, approximately the rural share of China's population came down from 86.7 per cent in the 1953 census and 81.2 per cent in 1964 census to 79.1, 73.6 and 63.8 per cent in the three following censuses in 1982, 1990 and 2000, respectively. Also as will be noted later, the provincial differences in fertility and abortion are largely attributable to the urbanization levels among the provinces, which range from 70 to 80 per cent in the municipalities and 40 to 50 per cent in other East China provinces, to 20 to 30 per cent in the Central China provinces and under 20 per cent in some of the provinces in West China. The urban-rural divide has been established as one of the most important variables influencing reproductive behaviour (Lin 1986; Peng 1991; Zhang 2000; Scharping 2003), and this is a clear feature of Figure 4.1.

In the 1950s, there were only minor urban-rural fertility differences; the first family planning campaign had a rather limited effect on urban fertility, as it was restricted to

educational work of the related organizations to propagate late marriage and contraceptive use and to provide abortion and sterilization in a few extreme cases (Scharping 2003). These activities were largely carried out in the big and coastal cities. In contrast to TFR, urban crude birth rates (CBR) in the 1950s were invariably higher than the rural CBRs as a result of the massive rural-urban migration (Peng 1991; Scharping 2003). Nevertheless, abortion rates in urban areas began to rise in the mid-1950s, as shown in Figure 4.2.

Figure 4.1 Total fertility rate and contraceptive prevalence rate, urban and rural China, 1950-1995

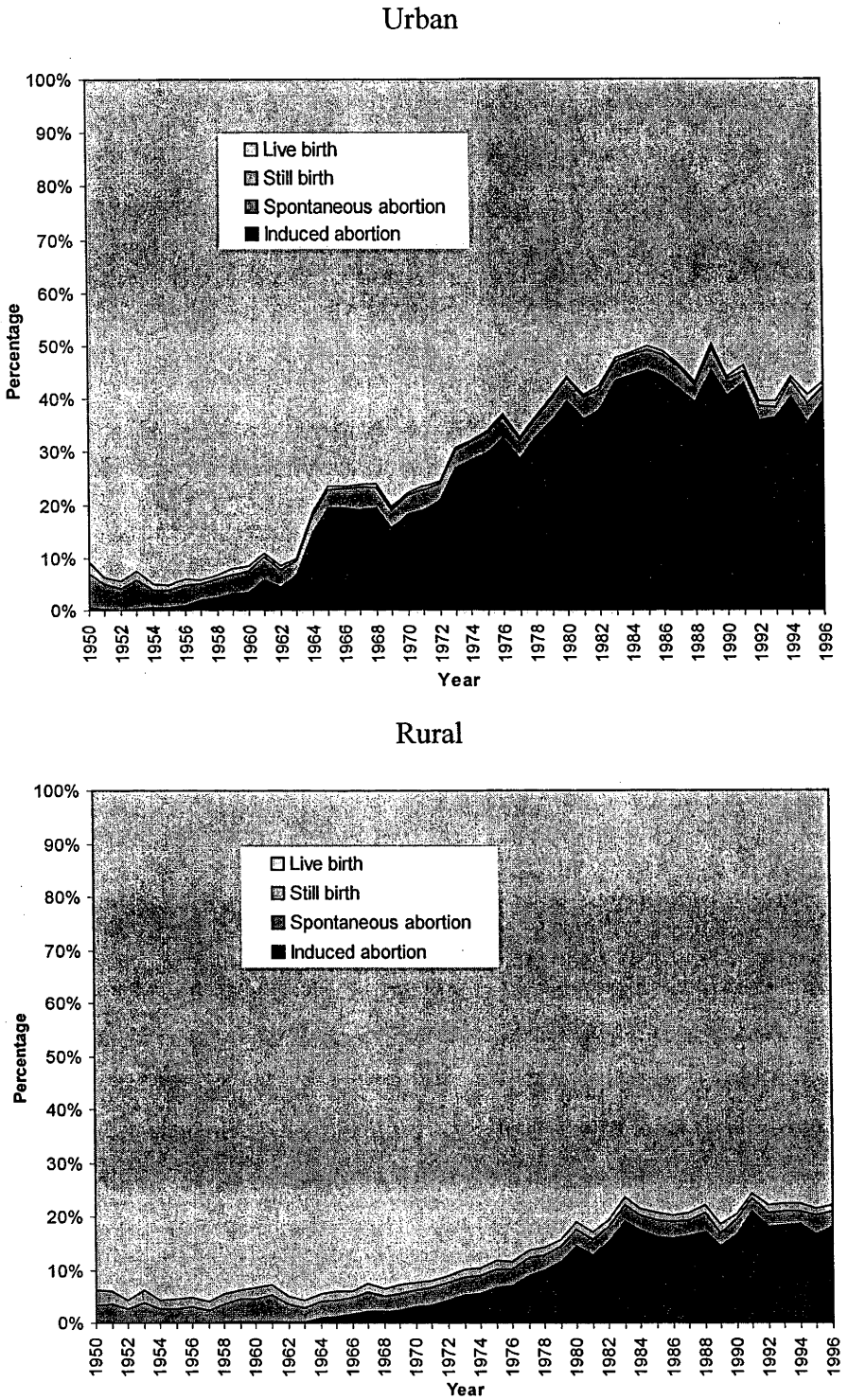


Source: *China Population Statistical Yearbook* for various years

However, the second family planning campaign during 1962-1966 brought urban fertility down considerably. This campaign mainly targeted the urban population, but this time, with increased efforts to implement planning to reduce population natural increase from two per cent in 1965 to one per cent in 1975 in the urban areas. Major steps towards birth control were guidelines advising two or three children per family, propagation of delayed marriage, contraceptive counselling, and complete liberalization and free provision of abortion services. There was a steep ascent in age at marriage in the cities. These were the responses to both the family planning campaign and the economic difficulties in feeding, housing and employing the urban population. Abortion rates rose dramatically between 1962 and 1965. The abortion proportion

among total pregnancies, which was only 4.4 per cent in 1962, ascended to 19.4 per cent in 1965 (Figure 4.2). However, the abortion rate also began to rise in rural areas in this period although very slowly, as the second family planning campaign was extended to some densely populated rural regions in East China.

Figure 4.2 Percentage distribution of reported pregnancy outcomes, China, 1950-1996



Source: 1988 Two-Per-Thousand Fertility Survey and 1997 NDRHS computer record data file.

More dramatic increase in abortions in rural areas occurred in the 1970s when the nationwide family planning program was vigorously implemented. The proportion of abortions rose from three per cent in 1970 to 12 per cent in 1979, a fourfold increase in the decade; while in urban areas, this percentage doubled from 18 per cent in 1970 to 36 per cent in 1979. The third family planning campaign most significantly affected fertility and population growth in China. Its goals were described as the 'later-longer-fewer' policy encouraging later marriage (23-25 years for women and 25-28 years for men), longer birth spacing (4-5 years between the first and second child) and fewer children (ideally two children per couple). Widespread and intensified efforts involved recruiting and training large numbers of health personnel to carry out the family planning work. In rural areas, 'barefoot doctors' throughout rural China played an important role in delivering contraceptive knowledge and methods and performing abortions. Family planning commissions were set up in rural communes and urban neighbourhood committees and factories, through which birth control activities were supervised and monitored down to the grass-roots levels. This nationwide network of facilities, personnel and services brought the vast majority of the Chinese population into the family planning program. The third family planning campaign during 1971-1979 produced a 50 per cent reduction of TFR in both urban and rural areas (from 2.9 to 1.4 in urban and from 6 to 3 in rural areas), nearly doubling the contraceptive rate in urban areas (from 33 per cent to 61 per cent) and more than tripling it in rural areas (from 13 per cent to 47 per cent).

However, the one-child policy introduced in 1979 produced extraordinary results in contraception and abortion despite a less significant effect on fertility. As shown in Figure 4.2, 40-45 per cent of pregnancies in urban areas and 15-20 per cent in rural areas were aborted. Contraceptive use reached 90 per cent in urban areas and slightly over 80 per cent in rural areas. The widely noted coercion and mass abortions occurred most notably in the early 1980s and the early 1990s in rural areas. The drastically heightened efforts were initially to achieve unrealistic demographic targets for reducing the population natural increase rate to 0.5 per cent in 1985 and zero in 2000, and later to close the loopholes created by policy relaxation. In rural areas, massive IUD insertions, sterilizations and abortions were performed to meet birth quotas. China, for the first time in world history, enforced a one-child policy and wrote into the country's constitution the commitment to birth planning as one of the citizens' duties and the

tasks of lower-level administrations (Scharping 2003). Despite this, Caldwell's argument that 'governmental coercion can reduce fertility almost indefinitely..... and, doubtless, if China were to try to enforce a no-child policy, its fertility would fall even lower' (Caldwell and Caldwell 1997: 23) is unimaginable.

Scholars (Lavely and Freedman 1990; Peng 1991) argue that before the birth control policy bringing about the national fertility transition, spontaneous fertility limitation was practised in some urban elites, particularly among the highly educated. Education, housing restrictions and full-time work involvement of wives played powerful roles in urban fertility decline. Lavely and Freedman (1990) examined Chinese marital fertility using the 1981 fertility survey and found that marital fertility was lower among the better educated in the urban strata before the introduction of the family planning programs. 'Education and urbanization were producing the conditions for an incipient transition even in the absence of direct government intervention' (Lavely and Freedman 1990: 357). They finally raised the question: 'What birth control methods did the better educated and urban strata use to lower their fertility?' (Lavely and Freedman 1990: 366). Data from the 1997 survey show that better-educated urban women, despite their higher contraceptive prevalence rate, were more likely to use less effective contraceptive methods, and more likely to have abortions.

The urban and rural divide being fundamental, in the later section on socio-economic differentials in abortion, urban-rural patterns of abortion will be further discussed in interacting with other socio-demographic and economic variables.

4.2.2 Provincial Variations

Regional data record that family planning and socio-economic development have brought about an increasing diversity of reproductive behaviour including abortion. China's fertility transition began in large municipalities and some of the east coastal provinces. In Shanghai, the TFR was already as low as 2.5 in the mid-1960s, while for the majority of the provinces, fertility remained high until the early 1970s. Before the 1980s, Shanghai was the pioneering area in developing and manufacturing a variety of contraceptives. When the 1957 abortion regulations abolished the various medical and social conditions limiting abortions, Shanghai and Zhejiang moved noticeably faster

towards introducing these changes (Scharping 2003). The Chinese vacuum aspiration technique for abortion was invented and used in Shanghai in the late 1950s.

Broadly speaking, timing of the start of family planning activities spread from the municipalities and some coastal provinces in the 1950s in the first family planning campaign, to Central China provinces in the 1960s in the second family planning campaign, and finally to the provinces in West China in the 1970s in the third family planning campaign. Provincial fertility changes roughly followed these patterns. Despite the unavailability of abortion data at province level before 1990, the approximate figures around 1965 stood out noticeably in the three municipalities (Table 4.1). The accumulated abortion ratios obtained from the 1988 fertility survey clearly point to the declining regional pattern from East to West China, contrasting to a reversed pattern in fertility.

Table 4.1 shows considerable variations in abortion ratio across the provinces. Unlike fertility patterns which more or less converged in the late 1990s, abortion variations seemed to be expanding. While East and North-East China usually have higher abortion ratios, some of the provinces in Central and West China had noticeably higher ratios in the 1990s than in the earlier decades. This confirms the existence of a massive abortion campaign in the early 1990s, mainly targeting the problem areas of family planning (Scharping 2003). In an extraordinary way, Shanghai has had the lowest fertility and highest abortion ratios over the last four decades. Indeed, Shanghai's abortion ratios in the 1990s were comparable to the Japanese ratios in the 1950s. However, this does not mean that their abortion levels were the same. When Japan had such high ratios, their fertility was 2-3 times the Shanghai fertility in the 1990s; therefore, similar abortion ratios in Shanghai imply much lower abortion levels.

An important difference between Table 4.1 and Figure 4.3 is the abortion variations between the three municipalities, Shanghai, Beijing and Tianjin. In Table 4.1, Shanghai's abortion ratios in the 1990s stood well over 200, 5-10 times the ratios in Beijing or Tianjin, while in Figure 4.3, abortion ratios in the three municipalities are largely similar. A potential explanation of such a difference lies in the nature of the data. Figure 4.3 is based on the 1997 survey which only recorded abortions for married women, while data in Table 4.1 are probably the marital and non-marital abortions combined. According to some studies, non-marital abortions in Shanghai have been

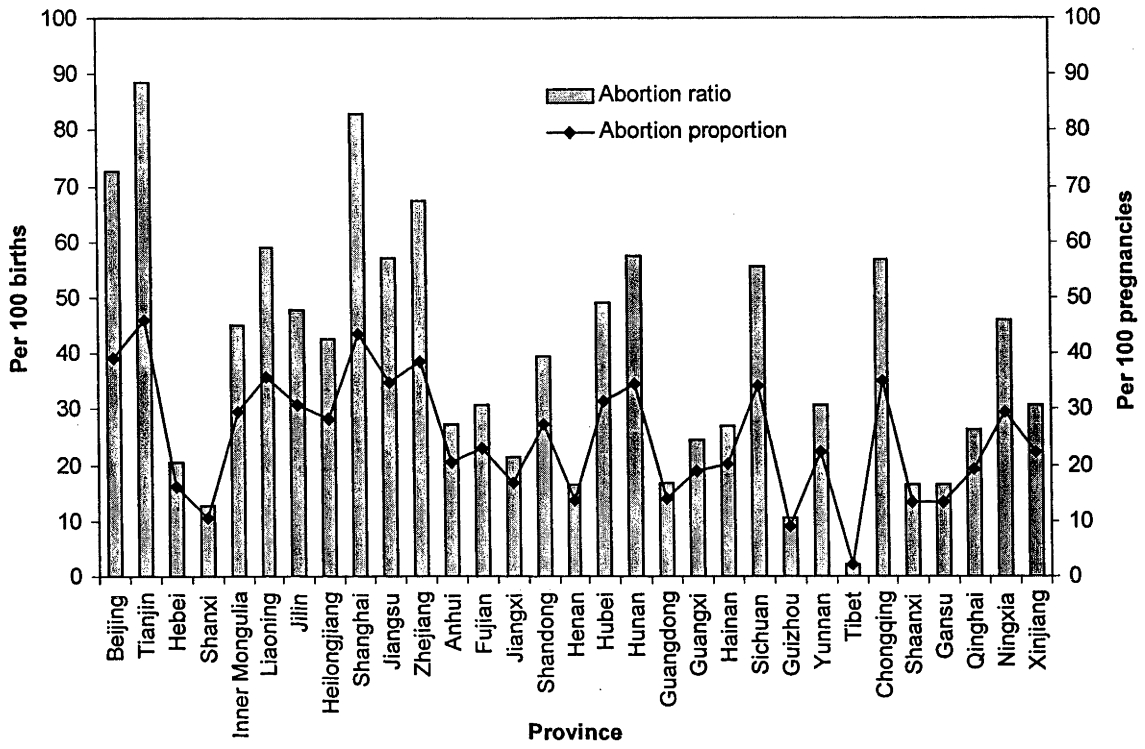
increasing rapidly since the late 1980s and are noticeably more numerous than in other cities. Another source of the variation is the belief that abortions in family planning statistics are considerably underreported, and it is possible that provinces in North and North-East China have more seriously underreported abortions than elsewhere.

Table 4.1 Abortion ratio by provinces, China, 1965-1998

Province	1965	1988	1990	1991	1992	1994	1996	1998
China		13	45	50	47	30	26	14
Beijing	35	35	35	55	30	18	15	20
Tianjin	38	27	35	36	25	20	21	20
Hebei	8	12	57	69	40	26	14	6
Shanxi		8	21	24	27	35	31	15
Inner Mongolia		9	25	23	27	16	16	8
Liaoning		16	15	21	16	9	8	5
Jilin	5	13	20	22	40	20	16	9
Heilongjiang		12	23	25	21	11	9	3
Shanghai	44	41	205	256	247	287	262	211
Jiangsu	15	21	48	57	47	27	27	21
Zhejiang		18	58	54	42	32	30	23
Anhui		12	29	45	55	48	32	16
Fujian		7	51	82	70	52	54	17
Jiangxi		10	33	41	51	30	37	25
Shandong		19	63	83	49	14	8	6
Henan		7	47	77	83	14	14	5
Hubei		16	42	48	46	37	34	23
Hunan	3	12	52	68	80	36	28	10
Guangdong	8	10	60	69	69	65	62	37
Guangxi		13	68	45	80	65	66	23
Hainan		10	47	50	41	40	35	23
Chongqing								20
Sichuan		28	45	48	33	26	26	19
Guizhou	2	6	38	41	41	39	40	22
Yunnan		12	55	57	51	30	23	14
Tibet							15	11
Shaanxi		8	41	47	39	39	37	7
Gansu		5	37	24	18	13	12	8
Qinghai		7	27	24	17	16	12	6
Ningxia		8	22	22	22	15	11	6
Xinjiang		9	33	21	23	16	10	5

Sources: Figures before 1996 are from Table 8 in Scharping (2003: 124). 1965 figures are calculated according to population data from Table 2.1 in Peng (1991: 33). 1988 figures are the accumulated ratios for all past abortions and births obtained from the 1988 fertility survey. Abortion ratios for 1990-1994 are period rates calculated from the abortion numbers of the State Family Planning Commission and birth data from 1990 census and sample surveys for 1991-1994. 1996 and 1998 figures are also period rates calculated by the author from the abortion umbers from 1997 and 1999 *China Family Planning Yearbook* with the birth numbers from the respective *China Population Statistical Yearbook.*

Figure 4.3 Abortion ratios and proportions by provinces, China, averages over 1990-1997



Source: 1997 NDRHS computer record data file.

Table 4.3 presents abortion patterns by pregnancy order across the provinces. These are the accumulated rates based on all past pregnancies, abortions and births obtained from the 1997 survey. One of the salient features of the Chinese family planning program is the increasingly decentralized policy implementation according to the local circumstances. Since the early 1980s, special regulations regarding family planning have been formulated by provincial authorities following the guidelines from the central government while meeting the local conditions. According to Feng and Hao (1992), there are considerable variations in the family planning regulations at the province level regarding limitation and management of childbearing. Even for urban areas, exceptions to the one-child norm can number from as low as five to as high as 10. These exceptions for rural areas are much more numberous. While Shanghai, Beijing, Tianjin, Jiangsu and Sichuan allowed exceptions to no more than 10 per cent of the rural population, the other 18 provinces essentially implemented an across-the-board policy for the couple with one daughter to have the second child, and there are still five provinces, Ningxia, Yunnan, Qinghai, Guangdong and Hainan, where virtually a two-child policy for all rural couples was enforced. Regarding contraceptive use and

abortion, most of the provinces required that couples used effective methods before they obtained the birth permit, used IUDs or other long-term methods when they already had a child, and obtained sterilization when there were two children. Unplanned (unauthorized) pregnancies had to be terminated early by remedial measures (10 provinces) or be terminated in a limited time duration, as soon as possible, or immediately by remedial measures (14 provinces). Because of the differences in these policies and the local political atmosphere or administrative functions, the extent to which actual fertility exceeds the policy target fertility ranges from less than 10 per cent in three provinces (Shanghai, Beijing and Zhejiang) to over 50 per cent in some of the provinces in Central and West China.

A summary of the recent provincial family planning regulations (Guo et al. 2003) indicates that except for the rural Tibetans in the Tibet region to whom no fertility limitation is applied, there are more than 110 specifications concerning birth limitation (number of children) across the provinces. These can be grouped into four categories. (1) A one-child policy is applied to urban China and to the rural Han Chinese in Beijing, Tianjin, Shanghai, Chongqing, Jiangsu and Sichuan. (2) A two-child policy for all rural couples in five provinces and only for rural couples whose first child is a daughter in 19 provinces (with some spacing). (3) A two-child policy for all couples who themselves both are the only child in 26 provinces (either one of the rural couple is an only child in five of these provinces). (4) Two-child or more policies for national minorities, the disabled, the remarried, the returned overseas Chinese and the workers involved in some special occupations. Applying this categorization to the 2000 census population, 35.9 per cent of the Chinese population is subject to the one-child policy, 52.9 per cent a one-and-a-half-child policy, 9.6 per cent a two-children policy, and 1.6 per cent a-three-or-more-children policy. Overall, about 60 per cent of the Chinese population are affected by the one-child policy, the remaining 40 per cent are subject to two-children-or-more policies.

Corresponding to these, contraceptive use and mix and abortion level vary considerably across the provinces. In 1997, contraceptive prevalence rates ranged from the lowest 58.1 per cent in Tibet and 63.7 per cent in Xinjiang to the highest 89.1 per cent in Ningxia and 88.6 per cent in Jiangsu (Table 4.2). While most of the provinces clustered over 80 per cent in contraceptive use, contraceptive mix varied substantially. The rate of sterilization is as low as 5 per cent in Xinjiang, and as high as 65 per cent in Fujian.

IUD use ranges from 18 per cent in Hainan to 61 per cent in Shanghai. It is interesting to note that the few most and least developed provinces have similar patterns of contraceptive use, relying more on user-controlled methods than sterilization; while most of the other provinces rely heavily on sterilization. Beijing, Tianjin, Shanghai, Zhejiang and Ningxia have notably higher percentages of use of less effective methods.

Table 4.2 Married women currently using contraception and contraceptive mix, China, 1997

	Percentage	Contraceptive mix			
Provinces	using	No use	Sterilization	IUD	Others
Beijing	85.44	14.56	11.17	50.97	23.30
Tianjin	80.00	20.00	9.00	44.00	27.00
Hebei	85.87	14.13	53.19	29.78	2.91
Shanxi	82.34	17.66	48.83	30.13	3.38
Inner Mongolia	86.15	13.85	33.08	46.92	6.15
Liaoning	83.22	16.78	17.01	58.16	8.05
Jilin	81.35	18.65	18.65	54.37	8.33
Heilongjiang	86.99	13.01	29.40	52.77	4.82
Shanghai	81.82	18.18	6.06	61.62	14.14
Jiangsu	88.60	11.40	30.39	52.82	5.39
Zhejiang	88.46	11.54	44.44	33.33	10.68
Anhui	85.46	14.54	47.33	29.89	8.24
Fujian	87.97	12.03	64.95	20.62	2.41
Jiangxi	83.63	16.37	58.33	24.70	0.60
Shandong	86.65	13.35	43.75	36.12	6.78
Henan	83.95	16.05	54.58	26.87	2.50
Hubei	85.62	14.38	51.13	28.08	6.41
Hunan	83.26	16.74	50.51	27.61	5.14
Guangdong	85.25	14.75	59.17	22.50	3.58
Guangxi	82.63	17.37	47.42	31.69	3.52
Hainan	75.41	24.59	57.38	18.03	0.00
Sichuan	82.34	17.66	28.46	49.94	3.94
Guizhou	75.32	24.68	51.60	21.47	2.24
Yunnan	71.11	28.89	22.80	40.18	8.13
Tibet	58.06	41.94	19.35	32.26	6.45
Chongqing	80.75	19.25	34.47	43.17	3.11
Shaanxi	85.29	14.71	56.86	25.49	2.94
Gansu	89.08	10.92	54.20	28.99	5.88
Qinghai	66.07	33.93	32.14	26.79	7.14
Ningxia	83.33	16.67	24.07	37.04	22.22
Xinjiang	63.70	36.30	5.19	49.63	8.89
Total	83.83	16.17	41.63	36.42	5.78

Source: 1997 NDRHS computer record data file.

Table 4.3 Accumulated abortion ratios and proportions by provinces, China, 1997 NDRHS

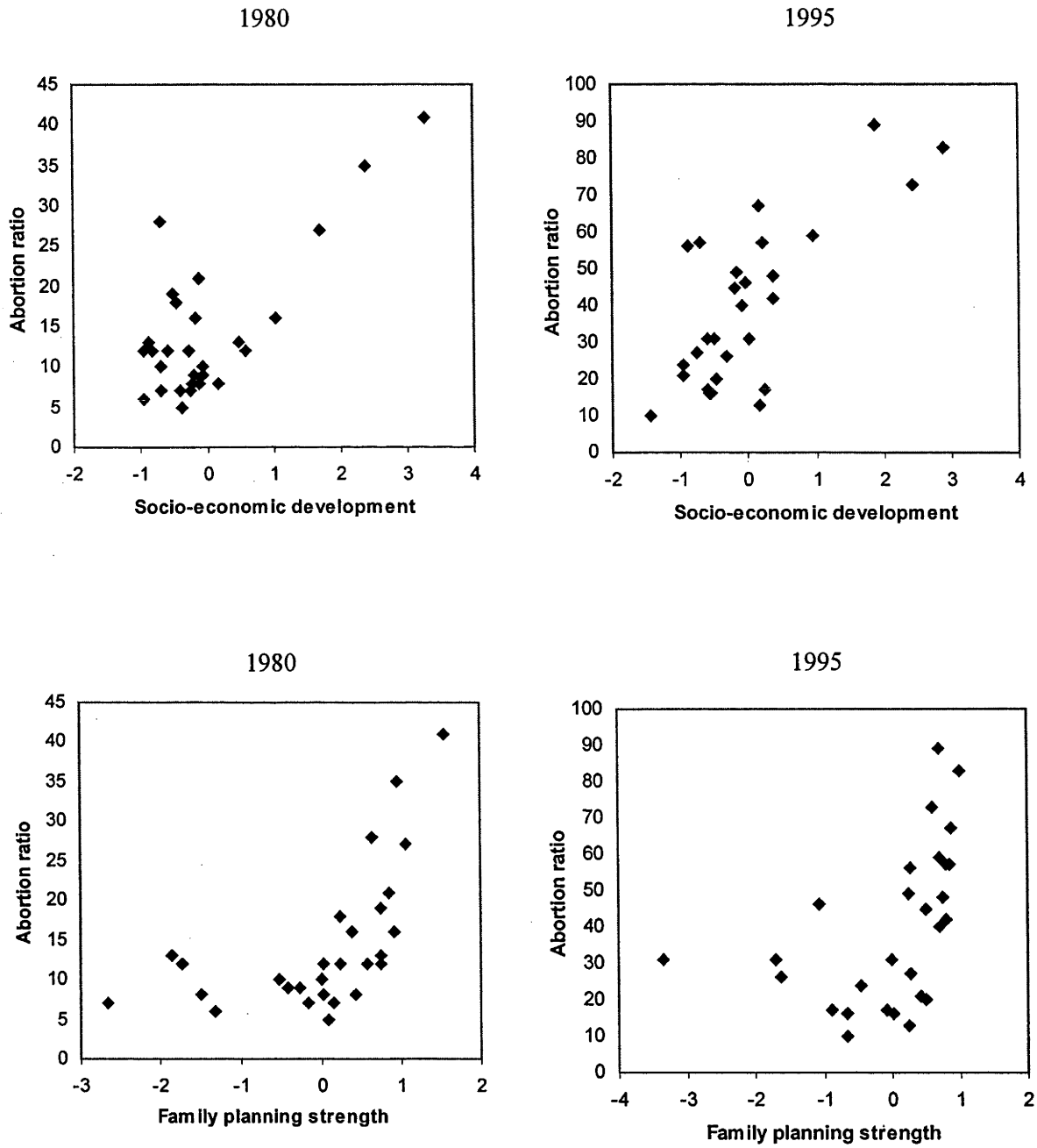
Provinces	Abortion ratio				Abortion proportion			
	Total	1	2	3+	Total	1	2	3+
Beijing	59.20	13.66	127.59	167.74	37.19	12.02	56.06	62.65
Tianjin	64.06	2.20	184.62	290.91	39.05	2.15	64.86	74.42
Hebei	18.37	1.84	26.25	43.58	15.52	1.81	20.79	30.35
Shanxi	15.84	2.06	18.57	37.43	13.67	2.02	15.66	27.24
Inner Mongolia	22.64	1.77	42.37	47.89	18.46	1.74	29.76	32.38
Liaoning	46.44	4.37	88.65	160.24	31.71	4.19	46.99	61.57
Jilin	39.62	2.70	97.53	91.18	28.38	2.63	49.38	47.69
Heilongjiang	26.22	1.64	50.86	61.19	20.77	1.61	33.71	37.96
Shanghai	64.15	8.18	229.73	237.50	39.08	7.56	69.67	70.37
Jiangsu	39.80	6.43	71.80	90.20	28.47	6.04	41.79	47.42
Zhejiang	43.25	9.51	79.80	71.64	30.19	8.69	44.38	41.74
Anhui	23.19	3.68	32.40	48.44	18.83	3.55	24.47	32.63
Fujian	15.26	1.50	25.79	25.63	13.24	1.48	20.50	20.40
Jiangxi	11.26	1.33	12.74	23.72	10.12	1.31	11.30	19.17
Shandong	23.38	4.76	36.70	50.45	18.95	4.54	26.84	33.53
Henan	11.62	1.17	16.80	25.59	10.41	1.16	14.38	20.37
Hubei	29.20	2.52	38.02	65.78	22.60	2.46	27.55	39.68
Hunan	21.54	4.04	26.12	47.29	17.72	3.88	20.71	32.11
Guangdong	16.91	4.00	22.97	27.67	14.46	3.85	18.68	21.67
Guangxi	20.82	5.93	19.63	37.15	17.23	5.60	16.41	27.09
Hainan	15.19	5.26	17.39	23.64	13.19	5.00	14.81	19.12
Sichuan	45.53	8.57	51.07	134.50	31.29	7.89	33.81	57.36
Guizhou	10.03	2.23	7.17	20.30	9.11	2.18	6.69	16.88
Yunnan	20.97	2.28	17.61	45.95	17.33	2.23	14.97	31.48
Tibet	1.77	0.00	0.00	3.51	1.74	0.00	0.00	3.39
Chongqing	33.84	12.02	40.27	74.14	25.29	10.73	28.71	42.57
Shaanxi	12.73	2.16	22.68	20.30	11.29	2.11	18.49	16.88
Gansu	13.53	2.39	22.07	24.74	11.91	2.34	18.08	19.83
Qinghai	20.91	4.44	26.67	37.14	17.29	4.26	21.05	27.08
Ningxia	34.95	11.63	86.36	31.58	25.90	10.42	46.34	24.00
Xinjiang	16.88	2.68	21.13	27.20	14.44	2.61	17.44	21.38
Total	24.78	4.20	36.36	50.46	19.86	4.03	26.67	33.54

Note: Abortion ratio is the ratio of the number of induced abortions to the number of live births; abortion proportion is the ratio of the number of induced abortions to the number of pregnancies.
Source: 1997 NDRHS computer record data file.

While provinces with higher rates of use of less effective methods have higher abortion rates, these provinces also have higher rates of overall use of contraception. Another explanation of the co-existence of higher abortion and higher contraceptive use is that abortion was more widespread among contraceptive users than among women who either did not practise family planning or practised it less frequently, since women who used contraception did not want to become pregnant, and were more likely than non-users to terminate a pregnancy (Wen 1993). Table 4.3 indicates that invariably second or higher-order pregnancies are much more likely to be aborted than the first pregnancy, but, because of either the greater strength of the population control policy or stronger motivation for control of family size of the couples themselves, the more developed provinces have higher abortion rates across the pregnancy orders than the less developed provinces.

Figure 4.4 demonstrates the relationship between family planning strength, socio-economic development and abortion rate at the provincial level. Family planning strength and socio-economic development are measured by factor scores generated from a range of indicators using the principal component method (See explanations in chapter 2). It is clear that more developed countries tend to have higher abortion rates, and provinces with greater family planning strength also have higher abortion rates. It is impressive that most provinces had low to moderate development level (cluster on negative values), but they had moderate to high policy strength (cluster on positive values). Generally speaking, the more developed provinces tend to have greater strength in carrying out family planning. However, some less developed provinces also have greater family planning strength. At the same time, a few more developed provinces have fairly weak policy implementation. This leads to the different patterns observed between the upper and lower panel of the Figure. The development-abortion linkage appears to be convex, while the policy strength-abortion relation tends to go concave. While more advanced socio-economic development also leads to higher abortion rates, greater family planning strength in some less advanced development areas makes development not invariably important.

Figure 4.4 Socio-economic development, family planning strength and abortion rate across the provinces, China, 1980 and 1995



Sources: Table 4.1, Figure 4.3 and *China Statistical Yearbook* and *China Family Planning Yearbook* for various years.

4.3 Socio-Demographic and Economic Differentials

Regional variations in reproductive and abortion behaviour are fuelled by differences in the social and economic composition of the populations in the subregions. Women in urban areas and in more developed provinces tend to have higher levels of education, higher social status, higher income, better knowledge of different contraceptive methods, and better and wider access to abortion facilities. They also tend to have the delayed marriage and childbearing and decreased family-size goals, enhanced education and job competition, and increased premarital sexual activity associated with more urbanized or Westernized styles of living. These more modernized characteristics and behaviour are significantly associated with their abortion probability and experience. This section examines socio-economic patterns of abortion in China using the 1997 survey data.

The 1997 survey is nationally representative with a sample population of 15213 women. Pregnancy, abortion and fertility events were occurring to the sample women during the 30 years before the survey, but were highly concentrated over the post-one-child-policy period, in which 72 per cent of the births and 90 per cent of the abortions took place. Therefore, the survey data reflect the process associated with childbearing and abortion in the circumstance of the implementation of China's family planning program, especially the one-child policy.

The sample women who are married have an average of 2.45 pregnancies, 1.86 live-births and 0.46 abortions (1.43 abortions for women having at least one abortion). This survey recorded 30388 pregnancies for 12158 married women, of which 23330 ended with live-births and 5780 with induced abortions, resulting in an abortion-birth ratio of 24.8 per cent. Among the live-births, 12264 were boys and 11066 girls, yielding a sex ratio at birth of 110.8. Despite some underreporting in births and abortions (Guo 2000), abortion patterns and characteristics, which are in relative terms, are likely to be relatively reliable since the extent to which abortions are underreported is similar to that to which births are underreported.

Table 4.4 Socio-economic patterns of induced abortion, China, 1997 NDRHS

Characteristics	Total pregnancies	Live births	Induced abortions	Abortion ratio	Abortion proportion
Age					
15-19	1669	1453	122	8.40	7.31
20-24	13981	11543	1702	14.74	12.17
25-29	11190	8048	2648	32.90	23.66
30-34	3032	1938	992	51.19	32.72
35-39	580	307	250	81.43	43.10
40+	118	40	66	165.00	55.93
Place of residence					
Rural	24665	19822	3654	18.43	14.81
Urban	5905	3507	2126	60.62	36.00
Nationality					
Han	27372	20748	5353	25.80	19.56
Minority	3198	2581	427	16.54	13.35
Education					
Illiterate	9350	7871	1008	12.81	10.78
Primary	10037	7928	1614	20.36	16.08
Junior high	7673	5433	1885	34.70	24.57
Senior high	2824	1736	975	56.16	34.53
College+	686	361	298	82.55	43.44
Pregnancy order					
1	12062	10981	459	4.18	3.81
2	9451	6623	2416	36.48	25.56
3	5190	3420	1547	45.23	29.81
4	2325	1445	768	53.15	33.03
5+	1542	860	590	68.60	38.26
Parity[a]					
0	1180	960	86	8.96	7.29
1	11097	7113	3550	49.91	31.99
2	4136	2857	1117	39.10	27.01
3+	2145	1468	568	38.69	26.48
Prior abortions[a]					
0	15111	10793	3585	33.22	23.72
1	2629	1283	1262	98.36	48.00
2	599	248	335	135.08	55.93
3+	139	74	139	187.84	63.47
Pregnancy interval[a]					
<12	2621	797	1556	195.23	59.37
12-23	6564	4483	1797	40.08	27.38
24-35	4771	3713	918	24.72	19.24
36-47	2037	1586	385	24.27	18.90
48+	2564	1818	665	36.58	25.94
Policy period					
<1980	7469	6430	627	9.75	8.39
1980-89	13794	10476	2689	25.67	19.49
>1989	9307	6423	2464	38.36	26.47
Region					
East	11248	7761	2972	38.29	26.42
Central	15614	12552	2322	18.50	14.87
West	3708	3016	486	16.11	13.11
Total	30570	23329	5780	24.78	18.91

Note: Abortion Ratio=Induced Abortions / Live Births*100; Abortion Proportion= Induced Abortions / Total Pregnancies*100. [a]Calculations are based on the second or higher-order pregnancy, because parity, prior abortions and pregnancy interval are not applicable to the first pregnancy.
Source: 1997 NDRHS computer record data file.

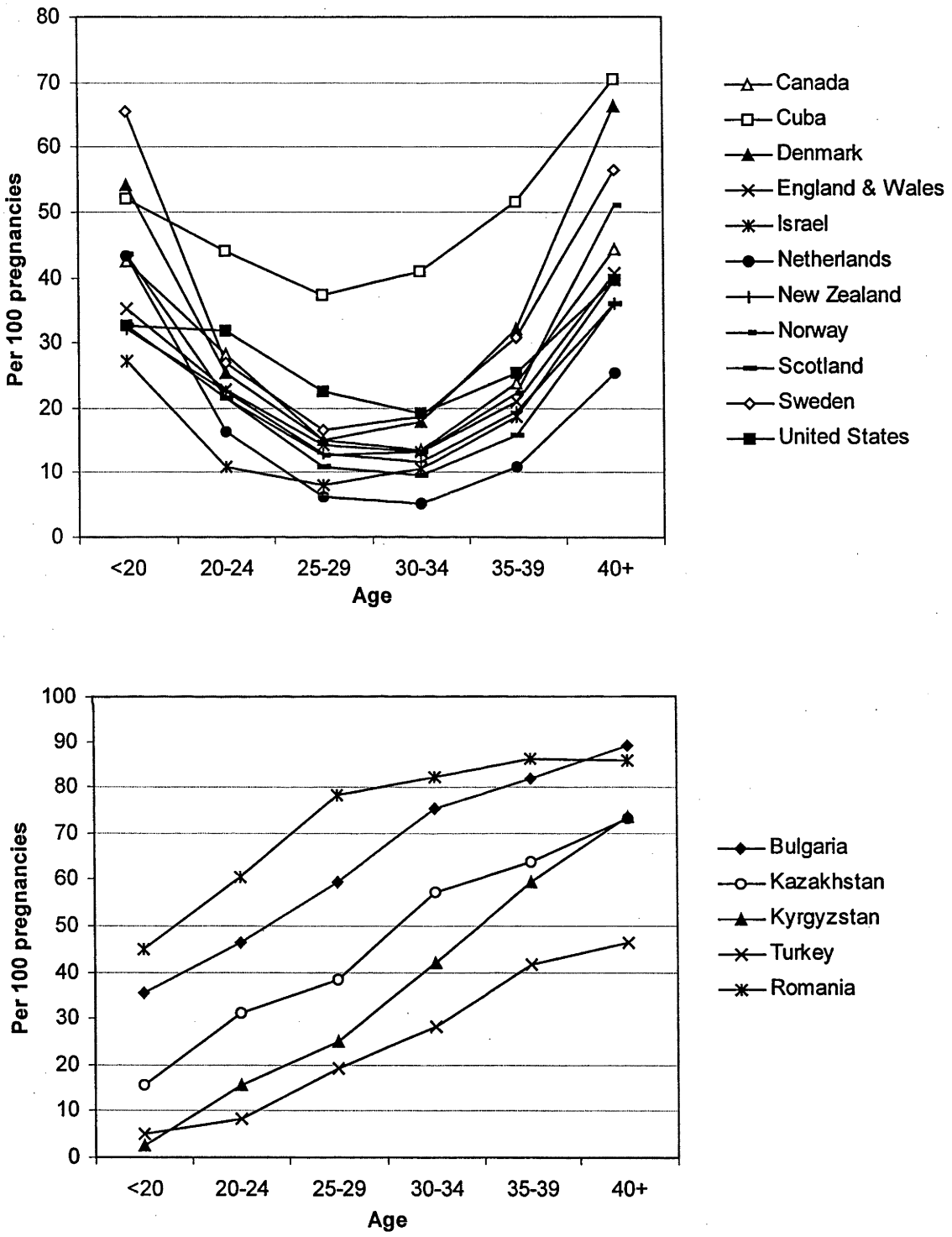
4.3.1 Age Pattern

There are significant differences in the incidence of abortion across socio-economic and demographic subgroups, as shown in Table 4.4. Age, pregnancy order and parity are among the most fundamental demographic factors that are associated with the likelihood of abortion. In countries where abortion is legal, abortions are obtained at all stages of women's reproductive lives between menarche and menopause (Tietze and Lewit 1981). The relationship between age and abortion is closely related to women's sexual activity, fecundability, and family-building experiences.

Data available from a number of countries, mainly in Europe, show that there are two main patterns in the abortion rates according to age group (Figure 4.5): a U shape, in which abortion rates are higher at the very beginning and the end of the reproductive span and lower in the middle ages; and a monotonic increase pattern, in which the abortion rate is lowest at the beginning of women's reproductive career and rises monotonically with age (Bankole et al. 1999). Underlying patterns of sexual activities, particularly premarital sex, and family formation and building explain the distinct variations. However, some of the countries in the 'West' pattern characterized by higher teenage abortion rates, for example, Denmark and Finland, shifted from the earlier monotonic increase pattern in the 1960s; the former East Germany, Hungary and Singapore also did so in the 1970s (Tietze and Henshaw 1986). No data are available, however, to suggest such that a shift in age patterns of abortion is widespread during the demographic transitions and when countries experience modernization.

The age pattern of abortion in China conforms to the monotonic increase pattern (Table 4.4). Pregnancies aborted range from 7 per cent at age 15-19 to 56 per cent at age 40 and over. However, it should be noted that the 1997 survey only recorded abortions for married women. Non-marital abortions may contribute to a higher teenage abortion rate, but this is more relevant in the large cities. For a population predominantly rural and with sexual intercourse largely limited to within marriage, one cannot expect that the age pattern of abortion in China has shifted or will soon shift to the 'West' pattern.

Figure 4.5 Age patterns of abortion, selected countries, circa 1995



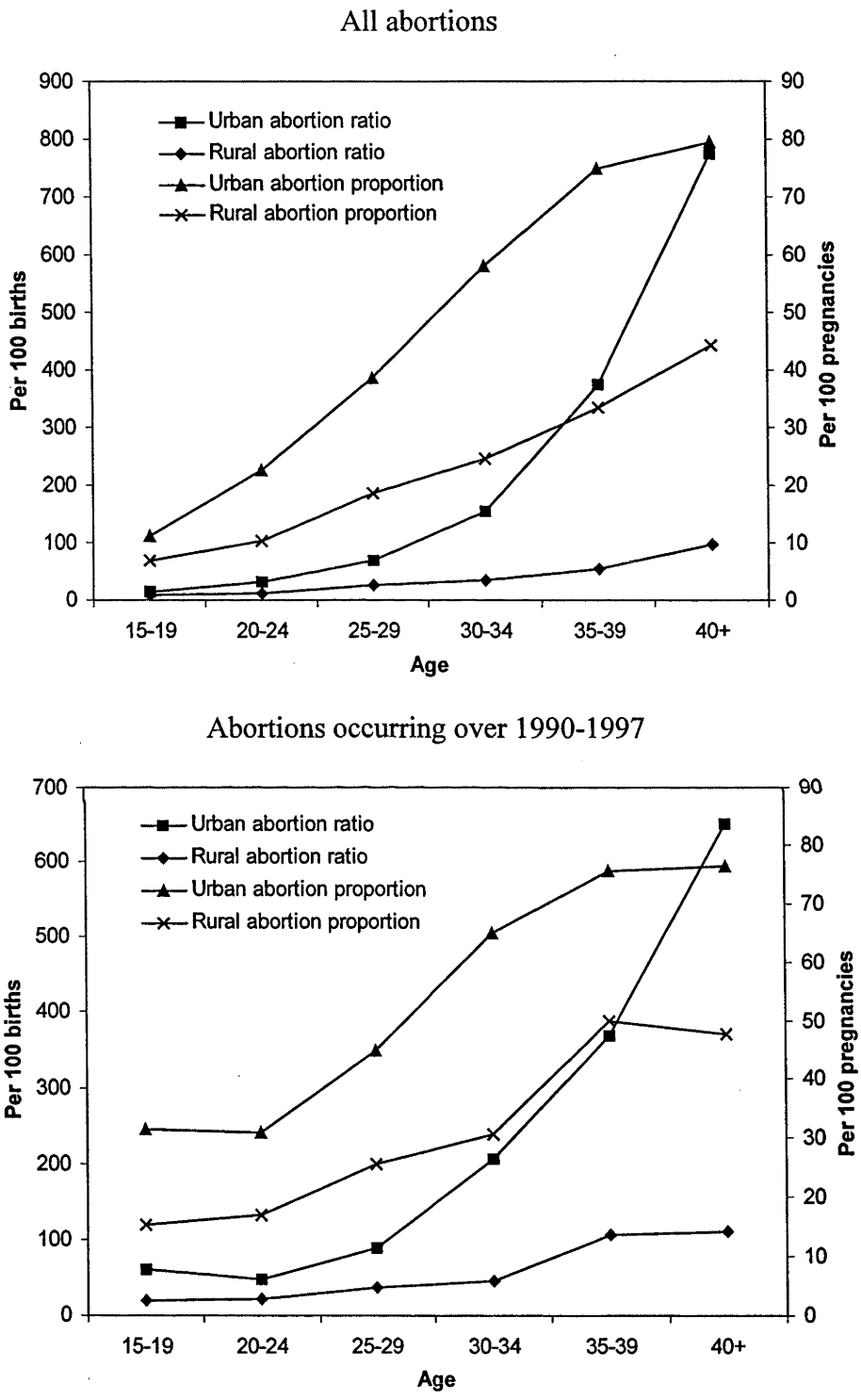
Source: Bankole et al. (1999:72, Table 3).

One important characteristic of the age pattern in China is that the abortion rate at the later stage of women's reproductive span is fairly high compared to the Western countries although considerably lower than in the East European countries. On the one hand, in China, women have virtually completed childbearing by age 35, and pregnancies which occur at this stage are largely resolved through abortion; on the other hand, as regulated by the family planning policy, women at this stage usually practise contraception by IUDs or sterilization, the fairly high abortion rates implying high rates of contraceptive failure.

While there are similar age patterns of abortion between urban and rural women in China, the gap between the two curves widens markedly with age (Figure 4.6). At all ages, urban women have a higher abortion rate than do rural women. The abortion proportion for urban women is about twice that of the rural women across the age groups, while the urban abortion ratio changes from two times as high at lower ages to over six times as high at later ages compared to the rural ratio. Compared to the rural areas, a pregnancy in urban areas is much more likely to be terminated by abortion than to be carried to term for live birth. This may reflect more rigid population control policy and wider and easier availability of abortion services in urban than rural areas, as well as other factors associated with urban and modernized circumstances influencing women's sexual and childbearing behaviour. In urban areas of China where less rigid regulation concerning use of specific contraceptive methods is applied, more choices of contraceptive methods are available, and use of less-effective methods or non-use of contraception are widespread, with consequently higher failure rates.

A comparison in Figure 4.6 between the recent and all past abortions shows that there is a noticeable rise in abortion rates under age 25 in urban areas. The abortion rate at age 15-19 began to be slightly higher than the rate at age 20-24. Owing to the small number of cases involved, it is still too early to suggest that a shift to the 'West' pattern is under way in urban China.

Figure 4.6 Age patterns of abortion, China, 1997 NDRHS

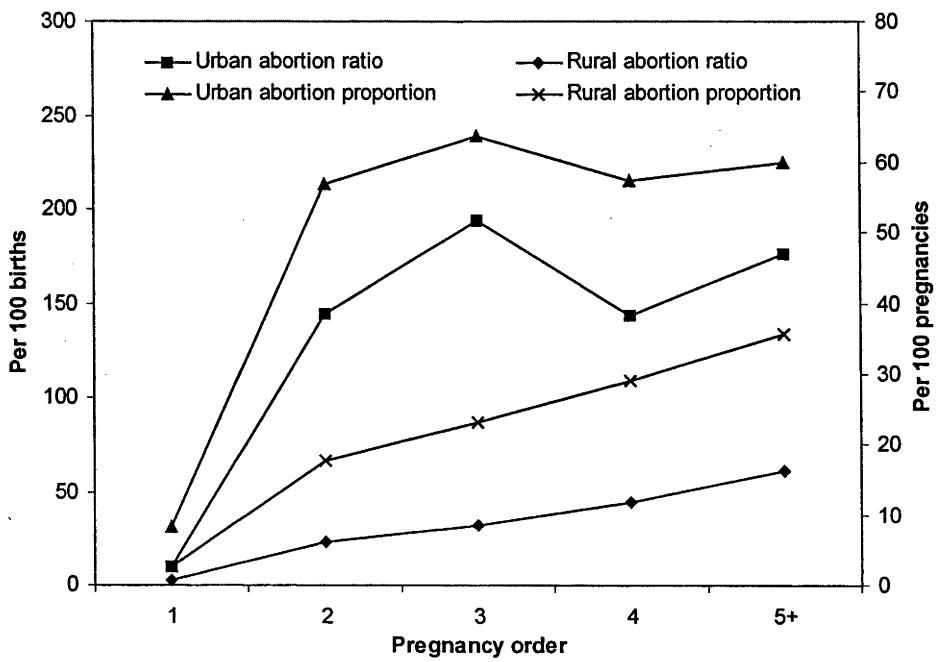


Source: 1997 NDRHS computer record data file.

4.3.2 Pregnancy Order and Parity

In the international literature, no data around the world have documented the abortion rates across the pregnancy order. This is probably due to the fact that women's detailed pregnancy and abortion histories are needed to establish such a relationship, but data of this nature are commonly unavailable. However, China's 1997 NDRHS permits such an analysis. Table 4.4 shows that abortion rates increase invariantly with pregnancy order in China. The vast majority of the first pregnancies are carried to term, while a quarter of the second pregnancies are aborted. Despite China's stringent family planning policy, less than 40 per cent of the fifth and higher orders of pregnancy are aborted. However, the pattern of urban women contrasts sharply to the rural pattern, as shown in Figure 4.7. Nearly 60 per cent of the second pregnancies are aborted in urban areas, but this percentage is less than 20 per cent in rural areas. As urban women also have lower fertility, the likelihood of a pregnancy at second or third order to be aborted rather than to be carried to term for urban women is six times that for their rural counterparts. As pregnancy order does not necessarily represent birth order, the policy effects on abortion are more markedly captured by the pattern across parities.

Figure 4.7 Abortion patterns by pregnancy order, China, 1997 NDRHS



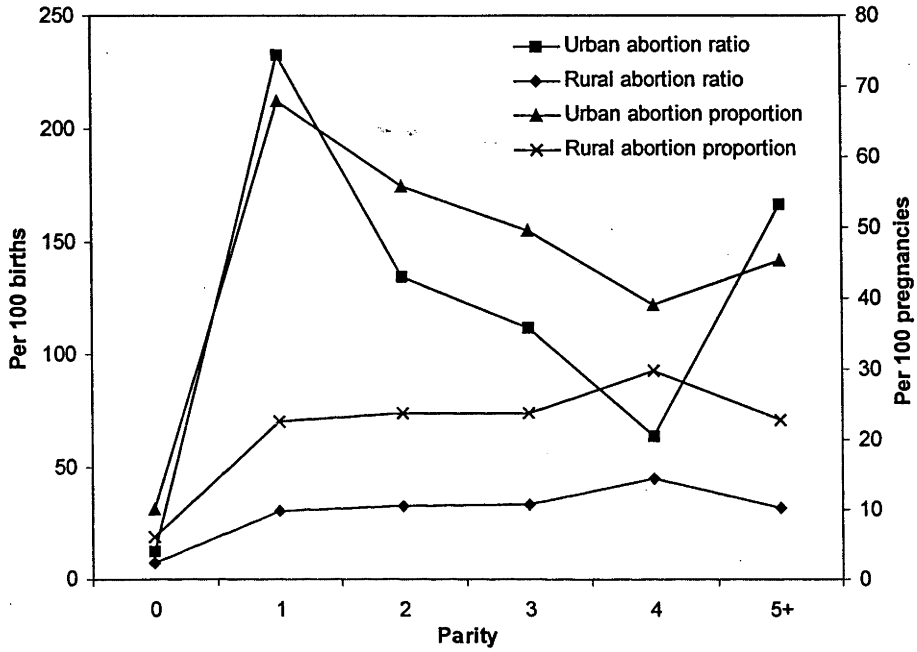
Source: 1997 NDRHS computer record data file.

Abortion patterns by parity are fairly well documented in the international literature. While abortion is obtained by low-parity women primarily to postpone childbearing, it is frequently resorted to by women with high parity to limit their family sizes. However, there are major differences among the countries. The most distinctive characterization is the extent to which abortion is obtained by nulliparous women. In most of the Western countries, the majority of abortions are obtained by childless women; while in Eastern Europe and Asia, women of zero parity have few abortions (Bankole et al. 1999). Three patterns of abortion have been documented for the countries where data are available: in Canada and the United States, the abortion rate is highest for nulliparous women; it is at a minimum at parity one, climbs to the second highest level for women having two or three children, and then declines once more. For some other Western countries, the pattern is rather similar except that the two peaks change places. The third pattern, typical of Asian populations, is that the lowest abortion rate is observed at parities zero and one, a rapid increase occurs after women have one or two children, and a maximum is reached at parity three or four before it declines (Tietze and Henshaw 1986; Bankole et al. 1999). Evidence throughtout the world suggests that the abortion rate for nulliparous women is going up while high-parity women are reducing their abortion rates as the result of a multitude of effects from policies, religions, establishment of small-family norms and increasing premarital pregnancies (Tietze and Henshaw 1986).

China follows the Asian pattern, but with marked a imprint from the family planning policy (Table 4.4). Contrasting sharply to most of the countries where women of parity one never have a very high or the highest abortion rate, Chinese women who have one child obtained the majority of abortions, and consequently have the highest abortion rate, a prominent fact establishing the impact of the one-child policy. The condition is more striking when urban and rural areas are compared, as shown in Figure 4.8. At parity one, nearly 70 per cent of the pregnancies for urban women are aborted, but only a little over 20 per cent in rural areas. However, it is interesting to note that after parity one, the changing pattern of abortion goes rightabout between urban and rural areas. While the rural rate goes up slightly until parity four and then drops at parity 5+, the urban rate declines quickly until parity four and then climbs again at parity 5+. The underlying reasons are not clear; but the small number of cases involved in higher parity may introduce some random variations. In explaining the abortion pattern, it is

also important to note that China's family planning policy has number, timing and spacing requirements on childbearing, which differ markedly between urban and rural areas.

Figure 4.8 Abortion patterns by parity, China, 1997 NDRHS



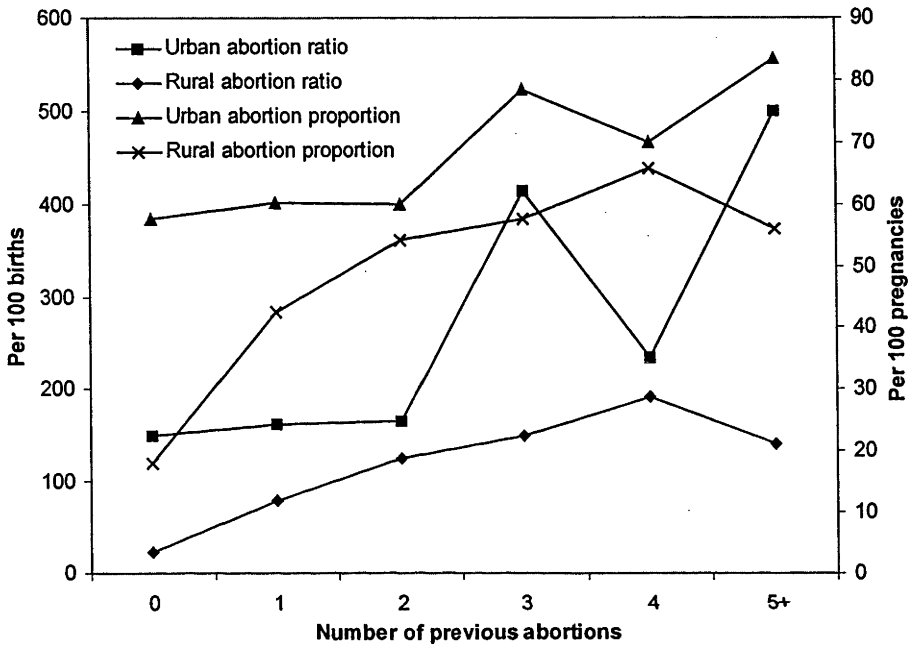
Source: 1997 NDRHS computer record data file.

4.3.3 Prior Abortion Experience

Throughout the world, the vast majority of abortions are obtained by women without any prior abortions. This percentage ranges from 51 per cent in Hungary to 94 per cent in India according to the available data from the late 1970s to the 1980s (Henshaw 1990). In China's 1997 NDRHS, 70 per cent of abortions are obtained by women without any abortion experience, and this percentage does not differ between urban and rural areas. Despite this, women's abortion experiences are highly associated with the likelihood of repeated abortions. Data presented in Table 4.4 indicate that the higher a woman's number of prior abortions, the more likely is the woman to experience an additional abortion. While 24 per cent of pregnancies are aborted by women without any prior abortion, this percentage has doubled for women having had one previous abortion. The changing pattern is broadly similar between urban and rural areas, although the urban levels are much higher (Figure 4.9). Women at zero abortion abort around 60 per cent of their subsequent pregnancies in urban areas, while this percentage

is only about 20 per cent in rural areas. When women have already had five or more abortions, more than 80 per cent of their subsequent pregnancies will be aborted in urban areas and 60 per cent in rural areas.

Figure 4.9 Abortion patterns according to previous abortions, China, 1997 NDRHS



Source: 1997 NDRHS computer record data file.

Table 4.5 demonstrates the extent to which women's prior abortion experience influences abortion use across the pregnancy orders. There are two impressive points: first, the pattern observed at the second pregnancy is just the reverse of the pattern appearing at later pregnancy orders; second, after the second pregnancy, women who have had any previous abortions are much more likely to obtain abortion at the next pregnancy than are women without prior abortion experience. The first point is reasonable, because women who have aborted their first pregnancy will have the first child at the second pregnancy, hence are less likely to abort the second pregnancy; while women who already have had a child from the first pregnancy will be more likely to abort the second pregnancy because of either the one-child policy or other considerations. The reversed pattern at the third pregnancy is, however, entirely due to women who have had one abortion over the last two pregnancies; while women who have aborted the last two pregnancies exhibit virtually the same pattern of abortion as the women without any prior abortions (data not shown). It is interesting to note that

the extent of influence of prior abortion experience is rather similar over the third to fifth-plus pregnancies.

Table 4.5 Effect of prior abortion experience on subsequent pregnancy outcomes

Prior abortion experience	Total pregnancies	Live births	Induced abortions	Abortion ratio	Abortion proportion
			2nd pregnancy		
Yes	402	322	58	18.01	14.43
No	9049	6301	2358	37.42	26.06
			3rd pregnancy		
Yes	1446	618	785	127.02	54.29
No	3744	2802	762	27.19	20.35
			4th pregnancy		
Yes	876	387	469	121.19	53.54
No	1449	1058	299	28.26	20.63
			5th+ pregnancy		
Yes	723	278	424	152.52	58.64
No	819	582	166	28.52	20.27

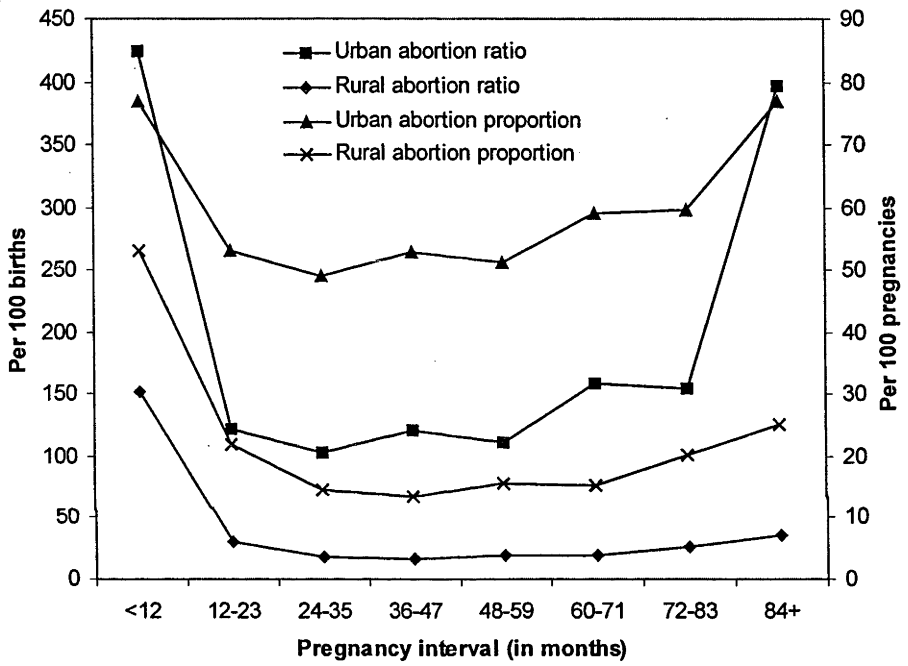
Source: 1997 NDRHS computer record data file.

4.3.4 Pregnancy Interval

Except for an abortion study in Matlab, Bangladesh (Ahmed et al. 1998), no other studies are available where abortion incidence by pregnancy interval is documented. Again, such data could only be available in retrospective fertility surveys where women's pregnancy and abortion histories are recorded. In the Matlab study, abortion patterns by women's socio-economic and demographic characteristics are examined over the period 1982-1991. One of the major findings is that induced abortion was several times higher if the preceding pregnancy interval was less than 12 months in length, than if it was 12 months or longer. A similar pattern is observed in China's 1997 survey. Data in Table 4.4 show that abortion rates at pregnancy interval less than 12 months are much higher than the rates at longer intervals. Spacing is a major consideration involved. High abortion rates in short pregnancy intervals imply mis-timing of the next pregnancy. However, in the Chinese context, the policy requiring spacing of 4-5 years between the first and second birth could also contribute to the high abortion rates in the low pregnancy intervals.

Figure 4.10 compares urban to rural abortion rates by pregnancy intervals. At each pregnancy interval, urban rates are three times or more the rural rates. However, two differences appeared. The urban pattern is an inverted U shape, while the rural curve is a reversed J pattern. The difference in rural rates across pregnancy intervals is more substantial than that in urban rates. These differences imply different forces operating: stopping in urban areas and spacing in rural areas, which has much to do with the different birth control policies and fertility aspirations in urban and rural areas in China.

Figure 4.10 Abortion patterns by pregnancy interval, China, 1997 NDRHS



Source: 1997 NDRHS computer record data file.

4.3.5 Socio-Economic Characteristics

Unlike the demographic characteristics of women obtaining abortions, socio-economic differences in abortion incidence are not very well documented in most countries in the world. The available data do reflect substantial variations in abortion incidence by place of residence, ethnicity, education, income and marital status; but patterns are not always consistent, in some cases change completely over time, and frequently depend on some of the demographic characteristics. Abortion rates are higher among urban dwellers and among the higher-educated groups in general, and also higher among unmarried women in Western countries. Racial or ethnic differences in abortion are largely due to differences in socioeconomic status. Under restrictive legislation,

wealthy, well-educated and well-connected women find it much easier to obtain legal abortions than do women of low socio-economic status (Tietze and Henshaw 1986). With changing legal, normative and socio-economic circumstances, abortion patterns vary markedly.

There are 56 ethnic groups in China, but the majority is Han nationality which constitutes more than 90 per cent of the population; the remaining group is the ethnic minority nationality population clustering largely on the North-West and South-West areas of China. The variations in socio-economic development and family planning policy explain the higher abortion rate for Han than for minority nationalities, to which a much looser birth control policy has been applied. Also cultural, moral and religious contexts surrounding abortion are likely to have different effects on nationalities in regard to abortion behaviour.

Education is by far the most consistent and important determinant of reproductive behaviour both globally and among subregions of China. Education has been documented as linked to declining fertility and increasing abortion rate. The Chinese pattern is also impressive in that the abortion rate rises rapidly with education advancement, and the highest education group has an abortion rate four times the rate of the lowest education group (Table 4.4). Although educated women have better knowledge of and access to contraceptive methods, they also tend to have stronger motivation to regulate family-building process, achieve a small family size, and prevent unplanned births. Data from the survey, however, show that women's higher education is associated with higher contraceptive failure resulting in abortions, suggesting frequent use of less efficient methods and non-use of any modern methods.

Since the 1997 survey recorded the pregnancy histories only for married women, we do not know the likelihood of induced abortion among unmarried women. However, local studies indicate a substantial increase over the last decade in sexual activity and induced abortion among the adolescents and unmarried young women in the large cities (Wu et al. 1992; Xu 1998; Wang 1999). Shanghai is a particularly serious case, where the share of abortions by unmarried women among the city's abortion total rose to nearly a quarter in the early 1990s (Scharping 2003), despite the fact that this percentage is still considerably lower than in most Western countries.

4.3.6 Rural Community-Level Characteristics

The role of individual characteristics in shaping women's fertility and abortion behaviour is always reconstructed by the broad context in which women live. Scholars argue that better environmental and developmental conditions, on the one hand, create greater motivation for controlling births, and on the other hand, facilitate the implementation of the family planning program (Wang 1987; Peng 1991). Even in a country with an active government policy to reduce fertility, a substantial proportion of differences in fertility can be attributed to the general level of development. A study on fertility variations in Hebei province of China suggests that the considerable variation in fertility among rural villages can be only partly explained by the performance of the family planning program. Community-level socio-economic development accounts for the additional variation (Wang 1987). 'Government programs, although important, have not operated in a vacuum' (Birdsall and Jamison 1983: 651), and the powerful government family planning programs have been far from able to overcome the effects on fertility of socio-economic development at the community level, although they seem to have declined. In terms of the proximate determinants of fertility, it is interesting to be noted that socio-economic characteristics of local communities affect fertility more through later marriage and use of abortion than through contraceptive practice (Wang 1987).

The 1997 NDRHS provides rural community (village-level) characteristics linking individual woman's fertility and abortion behaviour. Tables 4.6 and 4.7 show the variations in the three major proximate determinants of fertility according to the community-level characteristics. It can be seen that variations in contraceptive use are not as substantial as those in marriage rates and abortion rates, which may support to the conclusion that socio-economic characteristics of local communities affect fertility more through later marriage and use of abortion than contraceptive practice.

Table 4.7 further confirms to the fact that more-developed communities have higher abortion rates than do less-developed communities. While topography and type of drinking water cause only small differences in abortion incidence, the other three variables have marked effects on abortion rates. Villages that have electricity, are located closer (in kilometers) to the county seat and are wealthier (in terms of 1996 *per capita* income expressed in Chinese yuan) have considerably higher abortion rates. In fact, electricity, distance to the county seat and income are more representative of the development level than the other two environmental variables.

Table 4.6 Marriage and contraceptive use by community-level characteristics, rural China, 1997 NDRHS

Community characteristics	Early marriage rate	Late marriage rate	Contraceptive prevalence rate	
			All methods	IUD and sterilization
Topography				
Plain	30.72	23.20	86.20	83.24
Other	44.10	15.93	83.69	80.99
Water source				
Tap water	35.37	21.56	84.93	81.27
Other	39.99	17.81	84.62	82.16
Electricity				
Yes	37.96	19.14	84.86	82.11
No	65.02	9.44	78.95	74.46
Distance				
<20	35.63	20.67	84.75	81.20
20-39	36.45	20.11	84.52	82.21
40+	46.75	14.25	84.91	82.66
Income				
<1000	51.64	13.73	79.41	76.69
1000-1999	37.46	17.72	85.33	83.12
2000-2999	31.22	23.15	87.40	84.40
3000+	29.46	26.33	88.79	83.79
Total	38.67	18.88	84.71	81.91

Source: 1997 NDRHS computer record data file.

Table 4.7 Abortion patterns by community-level characteristics, rural China, 1997 NDRHS

Community characteristics	Total pregnancies	Live births	Induced abortions	Abortion ratio	Abortion proportion
Topography					
Plain	10012	7971	1582	19.85	15.80
Other	14637	11839	2068	17.47	14.13
Water source					
Tap water	7084	5542	1195	21.56	16.87
Other	17536	14249	2445	17.16	13.94
Electricity					
Yes	23981	19209	3611	18.80	15.06
No	639	582	29	4.98	4.54
Distance (km)					
<20	10101	7848	1762	22.45	17.44
20-39	8415	6813	1212	17.79	14.40
40+	6149	5161	680	13.18	11.06
Income (yuan)					
<1000	6042	5019	697	13.89	11.54
1000-1999	10312	8437	1390	16.48	13.48
2000-2999	5834	4577	995	21.74	17.06
3000+	2477	1789	572	31.97	23.09
Total	24665	19822	3654	18.43	14.81

Note: Abortion Ratio=Induced Abortions / Live Births*100; Abortion Proportion= Induced Abortions / Total Pregnancies*100. These community characteristics are village-level variables. Because of missing values, the sum of subcategories does not necessarily equal the total.
Source: 1997 NDRHS computer record data file.

Of major importance is income. Income-abortion linkages are less frequently documented in abortion studies. Scattered evidence from South Korea, India and the United States indicates that lower income levels were associated with lower, rather than higher, abortion rates (Tietze and Henshaw 1986). There are also studies in China that show abortions more frequently occur to women in the commercial business sector (Xiao and Zhang 2000; Meng et al. 2000); these women usually have higher incomes and obtain abortions in better medical facilities. However, excluding abortions to unmarried people or outside marriage, abortion services are provided free of charge to married people in China through the family planning program. The relationship observed in the 1997 survey, of higher-income women having higher abortion rates, may imply that these women are more mobile and obtain abortions in urban facilities where a wider range of abortion services are available. On the other hand, higher income may also interact with other more modernized characteristics causing higher abortion rates.

4.4 Reasons for Abortion

There are many reasons why women have induced abortions. Most obviously women obtain an abortion exclusively because the pregnancy is unintended. While this is clearly a first level of explanation, for many women there is a wide range of more specific underlying conditions and reasons. Unintended pregnancy is a worldwide reality, but unauthorized pregnancy ('unplanned pregnancy' in Chinese term) is a virtually unique Chinese characteristic causing many abortions.

There is limited empirical evidence on specific reasons why women obtain abortions around the world. This is partly due to the difficulty of collecting such information as it involves asking women to articulate the complicated and sensitive process leading to abortion. Research summarizing evidence from 27 countries has identified some clear regional patterns of abortion reason and the underlying circumstances (Bankole et al. 1998). Women in Sub-Saharan Africa cite socio-economic factors as the most prominent justification, as they regard pregnancy as a disturbance and disruption to their education, employment or early career development. This is consistent with the fact that the majority of abortions in these countries are obtained by young and unmarried women. As pronatalist values still prevail in much of Africa, women obtain abortions to delay rather than stop childbearing. In Asia, the most frequently cited reason for abortion is the desire to postpone or stop childbearing, with the latter being

more prevalent. This agrees with the widespread norms for smaller families and the fact that most of the abortions occur to married women. Evidence from India, South Korea, Taiwan and Mainland China also points to some relevance of sex selection. Reasons for abortion observed to be of primary importance in Latin America are socio-economic reasons and relationship problems. These are some of the major implications of the high prevalence of consensual unions in this region, as such unions incur high rates of dissolution and poor commitment of the partners. In general in developed countries, salient reasons for abortion are delaying or stopping childbearing, backed up by socio-economic considerations and relationship problems.

There are important variations in abortion reasons according to women's socio-economic and demographic characteristics. Younger women are more likely than older women to report postponing childbirth as the reason for abortion; they are also more likely to cite socio-economic factors. Married women primarily cite the desire to stop childbearing, and socio-economic circumstances, while the major concerns for the unmarried are socio-economic factors, youth or parental objections. Relationship problems are more likely to be stated among the unmarried women, while maternal or foetal health is more important among the married women. However, no clear association is established by the available information between women's education and abortion reasons.

Information on motives for abortion was not collected in previous fertility surveys in China, either locally or nationally. In the 1997 survey, there was a question asking women the reason for having an abortion, but it was only asked about the women's last abortion. There were six choices of the abortion reason: contraceptive failure, child health, self health, change in work or life planning, policy restriction and others. These categories are largely not comparable with those available from other countries. While contraceptive failure or not using any methods is among the important circumstances in which unintended or mistimed pregnancies occur in many developing countries, unauthorized pregnancies due to policy restriction are peculiarly Chinese. It is also believed that not all instances of contraceptive failure are the result of technical imperfection. Some are purposely induced in order to have an opportunity to have an additional child. Only when authorities discover the pregnancy and insist on a termination is the woman left to conclude that a 'contraceptive failure' occurred.

To regroup the abortion reasons in a synthesized way, child health, self health and change in work or life planning can be summarized as personal reasons. Policy

restriction involves both timing and number of pregnancies, including pregnancies not meeting the late childbearing age (24 years) or those after the first birth in urban areas, and pregnancies not meeting the required four-year-interval between the first and second births or those after the second birth in rural areas. Table 4.8 presents the distribution of the most recent abortion by the four categories of reason.

Contraceptive failure and policy restriction are the two major reasons for women across all socio-demographic groups having the abortions, which comprise 60-80 per cent of all the abortions. Women at younger age groups have a higher proportion of the abortions from policy restriction, which outnumber their proportion from contraceptive failure. The opposite pattern holds for women aged 25 plus. Rural women have a much higher percentage of abortions caused by policy restriction, while nearly half (46 per cent) of the abortions for urban women resulted from contraceptive failure. The nationality difference is small and Han women have higher contraceptive failure resulting in abortions. It is interesting to note that higher-educated women have higher contraceptive failure resulting in abortions, which may indicate that higher-educated women usually use less effective methods or do not use any modern methods. The proportion of abortions from policy restriction falls sharply from the illiterate to the college plus group, indicating higher fertility desire not permitted by the policy for the less educated women.

Very interesting results are shown for parity-related abortion reasons. Zero parity is distinct in that about equally 40 per cent of the women obtained abortion for personal reasons and for policy restriction. Policy restriction when applied to zero-parity women usually means the timing problem of the pregnancy, which involves two dimensions: one is that the timing was earlier than the late-childbearing age limit, and the other is that the pregnancy occurred before the birth permit was issued. Even if the timing meets the late-childbearing age limit, a pregnancy without a birth permit is still unauthorized and needs to be terminated. But such cases are few, especially in rural areas. From parity 1 to 3+, the share of abortions resulting from contraceptive failure falls sharply and the share from personal reasons increases substantially. While the share from policy restriction only increases slightly, this is the biggest proportion for women at parity 2 and over having the last pregnancy aborted.

It is also interesting to note the relationship between number of prior abortions and the reasons for the last abortion. Women obtained the first abortion largely because of policy restriction (39 per cent) and contraceptive failure (34 per cent). This is

associated with the fact that abortion typically occurs after one birth and women also use contraception to delay the first birth. However, repeated abortions are more likely to result from contraceptive failure (50-60 per cent) than from policy restriction (25-30 per cent). But as noted earlier, some cases of contraceptive failure are in fact associated with policy restriction.

Table 4.8 Percentage distribution of the stated reason for last abortion

Characteristics	Contraceptive failure	Personal reasons	Policy restriction	Others	Cases
Age					
15-19	9.72	18.06	61.11	11.11	72
20-24	29.24	20.27	42.22	8.27	1125
25-29	40.52	17.21	34.43	7.84	1824
30-34	50.40	11.80	31.83	5.97	754
35-39	61.21	7.94	25.23	5.61	214
40+	47.27	14.55	32.73	5.45	55
Place of residence					
Rural	36.24	16.07	42.03	5.67	2558
Urban	46.10	17.36	25.84	10.70	1486
Nationality					
Han	40.55	16.10	35.92	7.44	3739
Minority	31.48	21.97	38.03	8.52	305
Education					
Illiterate	32.00	16.89	46.37	4.74	675
Primary	36.68	17.99	39.83	5.50	1145
Junior high	38.98	15.76	36.15	9.11	1339
Senior high	51.10	13.25	25.18	10.46	679
College+	51.94	23.30	16.99	7.77	206
Pregnancy order					
1	7.72	42.12	39.55	10.61	311
2	39.75	13.31	37.38	9.56	1600
3	44.98	13.45	35.63	5.94	1145
4	43.65	16.99	34.70	4.65	559
5+	44.99	17.72	31.70	5.59	429
Parity					
0	7.20	41.33	40.00	11.47	375
1	46.84	11.20	33.96	8.00	2438
2	38.05	16.59	39.15	6.22	820
3+	31.87	25.55	38.93	3.65	411
Prior abortions					
0	34.04	18.55	39.25	8.16	2782
1	50.27	13.38	30.31	6.04	927
2	58.37	9.39	24.90	7.35	245
3+	62.22	6.67	27.78	3.33	90
Total	39.86	16.54	36.08	7.52	4044

Source: 1997 NDRHS computer record data file.

4.5 Period of Gestation

The period of gestation at which the pregnancy is terminated is one of the most important factors associated with health consequences of induced abortion. The traditional division is between abortions in the first trimester (up to 12 weeks of pregnancy) and those in the second trimester (13-25 weeks), with markedly higher morbidity and mortality associated with the late-term abortions (Tietze and Henshaw 1986). However, in the countries where statistics on gestation period is available, it is not uniformly reported. Gestation period data collected from fertility surveys, such as China's 1997 NDRHS, are based on women's reports generally subject to some degree of inaccuracy due to either knowledge or recall lapse in the recollection of more or less distant events. The question of gestation period in the 1997 survey is only asked for the last abortion. Answers to the question 'number of months into pregnancy at last induced abortion' may not be reliable. Nevertheless, useful and valid assessment of patterns of reported gestation period can still be made. Tables 4.9 and 4.10 show the distribution of gestation period both over time and by socio-demographic characteristics of women.

Available data from other countries show that the vast majority of abortions are first-trimester procedures. Data obtained in the late 1980s indicate that the percentage of late-term abortions ranged from about only one per cent in Czechoslovakia, Italy and Hungary to 11-15 per cent in the United States, England and Wales, and India (Henshaw and Morrow 1990). Eastern European countries, despite their very high abortion rates, have for decades had the lowest percentage of late-term abortions, as second-trimester abortions are generally authorized only on medical indication; while Western developed countries have experienced a dramatic decline in the percentage of second-trimester abortions, reflecting a simplification of the procedures for obtaining an abortion and increasing availability and accessibility for abortion services (Tietze and Henshaw 1986). Similar trends have also occurred in India and Japan, the only two Asian countries for which data are available (Henshaw and Morrow 1990). Available worldwide data suggest that a shift towards earlier abortion is a universal trend.

Data from China's 1997 NDRHS demonstrate that around 80 per cent of the most recent abortions were first-trimester procedures (Tables 4.9 and 4.10). Before 1975, less than 10 per cent were second-trimester abortions. Since 1975, the percentage

distribution by gestation period has been steady, unlike the case in many other countries where major reductions in second-trimester abortions took place. The share of second-trimester abortions stood at over 18 per cent. The two upturns (over 20 per cent) appeared in the early 1980s and the early 1990s and were related to the abortion campaigns carried out at these times. There are sharp contrasts between urban and rural areas. On the one hand, late-term abortions are more frequent in rural areas; while the share of second-trimester abortions in urban areas has been declining since 1975 (with the exception of the period 1990-94). These patterns and trends reflect their urban-rural differentials in family planning policies, increasing convenience and availability of services and increased awareness of health consequences of late-term abortions in urban rather than in rural areas.

Table 4.9 Changes in gestation period over time, China, 1997 NDRHS

	Total		Urban		Rural	
Period	≤12 weeks	≥13 weeks	≤12 weeks	≥13 weeks	≤12 weeks	≥13 weeks
<1975	90.91	9.09	100.00	0.00	85.00	15.00
1975-79	81.82	18.18	90.83	9.17	76.38	23.62
1980-84	77.83	22.17	91.72	8.28	69.70	30.30
1985-89	81.84	18.16	95.20	4.80	72.65	27.35
1990-94	79.65	20.35	93.65	6.35	72.07	27.93
>1994	81.90	18.10	97.12	2.88	74.60	25.40

Source: 1997 NDRHS computer record data file.

There is often an inverse association between gestation period and women's socio-economic status (Tietze and Lewit 1981). Data from the United States indicate that late abortions occur most frequently among the youngest women. China's 1997 survey data also show that the highest proportion of second-trimester abortions occurred to women aged 15-19 (Table 4.10). The very high proportion of late abortions in the youngest women probably reflect their 'inexperience in recognizing the symptoms of pregnancy, unwillingness to accept the reality of their situation, ambivalence about the pregnancy, ignorance about where to seek advice and help, and hesitation to confide in adults' (Tietze and Henshaw 1986: 81). However, these represent a very small portion of all abortions.

Across all the socio-demographic groups, the bulk (70-90 per cent) of the last abortions are first-trimester procedures in China (Table 4.10). First-trimester abortion reports also tend to concentrate at 5-8 weeks of gestation. The distribution between first and second-trimester abortions is fairly stable across age groups over 20. Rural women have five times as many second-trimester abortions as their urban counterparts, suggesting that the use of abortion is to some extent aimed at achieving the desired number and sex of children.

Minority-nationality women have much higher proportions of second-trimester abortions than the Han, but this is not likely to be the result of the pressure of family planning policy since the government claims that the policy applied to minority populations is not strict. As expected, higher education is associated with reduced proportion of second-trimester abortions. One-third of the last abortions were second-trimester procedures for illiterate women, while this proportion was only three per cent for college-educated plus.

When abortion occurred at the second-plus pregnancy, there was a positive association between the percentage of second-trimester procedures and pregnancy order. Regarding parity, generally the proportion of the second-trimester procedures rose as women's parity increased, indicating some influence from the family planning policy. However, when women had repeated abortions, they were less likely to experience second-trimester procedures. The proportion of late-term abortions at the first pregnancy, at parity zero and at zero prior abortion is invariably higher, which is likely to be associated with the high proportion among the youngest women.

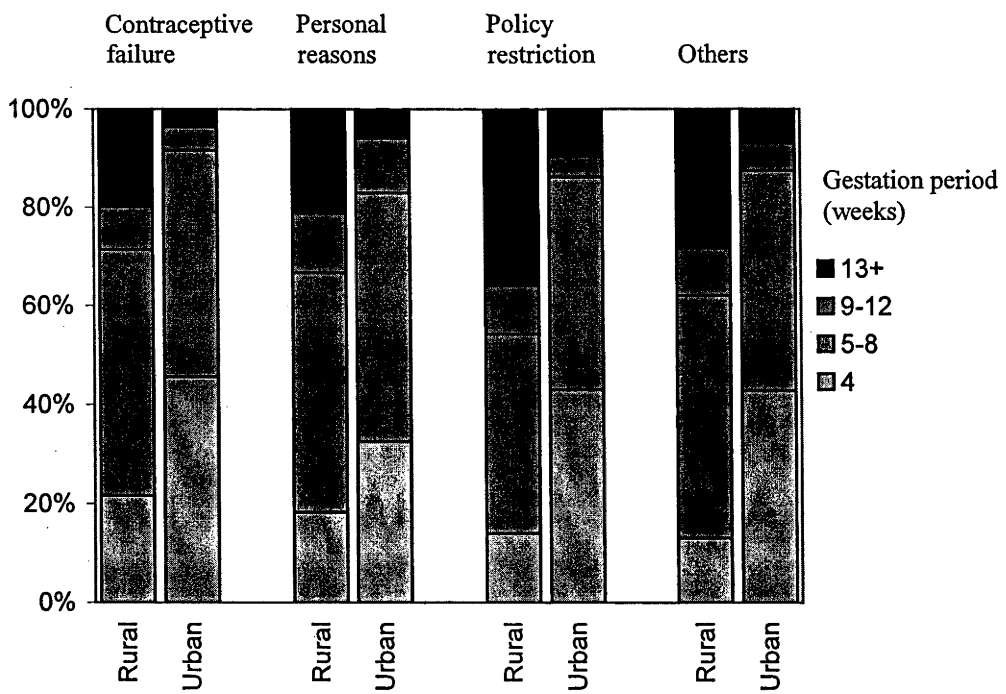
Table 4.10 Percentage distribution of the last abortion by gestation period

Characteristics	4 weeks	5-8 weeks	9-12 weeks	13+ weeks	Cases
Age					
15-19	11.11	38.89	11.11	38.89	72
20-24	25.51	46.93	8.89	18.67	1125
25-29	26.10	46.55	8.39	18.97	1824
30-34	29.84	43.37	7.16	19.63	754
35-39	29.91	41.59	7.94	20.56	214
40+	23.64	49.09	9.09	18.18	55
Place of residence					
Rural	17.36	45.54	9.81	27.29	2558
Urban	42.33	45.96	5.79	5.92	1486
Nationality					
Han	27.44	45.87	8.18	18.51	3739
Minority	15.41	43.61	10.16	30.82	305
Education					
Illiterate	14.67	39.70	10.96	34.67	675
Primary	17.64	45.85	9.43	27.07	1145
Junior high	29.72	48.02	7.99	14.26	1339
Senior high	41.83	46.39	5.15	6.63	679
College+	43.69	47.09	6.31	2.91	206
Pregnancy order					
1	24.12	44.69	11.90	19.29	311
2	29.94	46.00	7.75	16.31	1600
3	27.95	44.19	6.99	20.87	1145
4	21.82	46.51	9.66	22.00	559
5+	17.95	48.25	9.79	24.01	429
Parity					
0	24.53	42.67	12.27	20.53	375
1	30.68	46.35	7.42	15.55	2438
2	20.24	45.85	7.32	26.59	820
3+	16.30	44.28	12.17	27.25	411
Prior abortions					
0	25.52	44.79	8.84	20.85	2782
1	30.31	46.71	7.01	15.97	927
2	24.90	50.20	6.94	17.96	245
3+	23.33	51.11	10.00	15.56	90
Abortion reason					
Contraceptive failure	31.76	48.26	7.01	12.97	1612
Personal reasons	23.77	49.18	11.81	15.25	669
Policy restriction	21.59	41.06	8.36	28.99	1459
Others	28.62	46.71	7.57	17.11	304
Total	26.53	45.70	8.33	19.44	4044

Source: 1997 NDRHS computer record data file.

For whatever reason women carried out the last abortion, 70-80 per cent were first-trimester procedures; however, nearly 30 per cent of the abortions were more risky second-trimester procedures if women had the abortions because of policy restriction, which is substantially higher than that for the women who gave other categories of reason. Figure 4.11 shows that there are marked differences between the urban and rural areas. At each category of reason, a rural woman is 4-5 times more likely than an urban woman to obtain a second-trimester abortion. While policy restriction had the most significant influence on the likelihood of a second-trimester abortion both in urban and rural areas, as many as 36 per cent of the abortions in rural areas were second-trimester procedures: this percentage is only 10 per cent in urban areas. This rural percentage is among the highest in the world among the sizeable populations for which data are available (Henshaw and Morrow 1990). As the second-trimester abortions are not broken down by more advanced stages of gestation in the 1997 survey, further assessment of implications of particularly late-term abortion is impossible.

Figure 4.11 Gestation period of the last abortion by reason, urban versus rural China, 1997 NDRHS



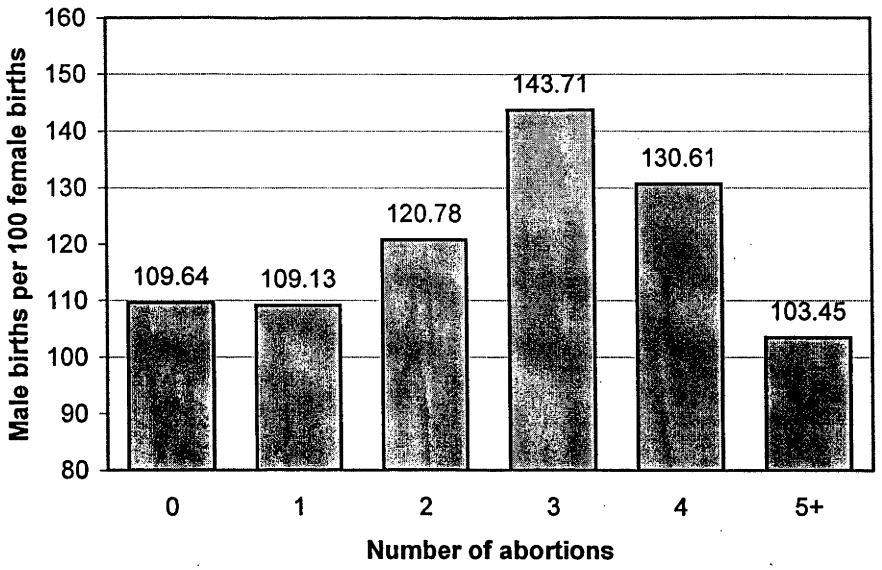
Source: 1997 NDRHS computer record data file.

4.6 Sex Preference

It is widely acknowledged, and some studies (see for example, Gu and Roy 1996; Chu 2001; Chen Wei 2002) also provide empirical evidence, that induced abortion in China is to some extent inappropriately used to select the sex of the next child given the number and sex of the children a woman already has. Sex-selective abortion is believed to be the main mechanism behind the increasingly high sex ratio at birth in China in the last decade. The 1997 survey data can also shed some light on the relationship between sex preference and induced abortion in China.

As noted earlier, in some Asian countries or areas, notably India, South Korea and Taiwan, women report 'foetal defect' as the main reason for abortion, and this is highly likely to be associated with sex selection (Bankole et al. 1998). In China's 1997 survey, no such abortion reason was stated, nor other categories implying sex-selective purpose. However, linking women's abortion numbers with the SRB has important implications for sex-selective abortions. Figure 4.12 shows the association of the SRB with the number of abortions. The sudden jump of the SRB between women who have had one abortion to those who have had two abortions clearly indicates the influence of the contradiction between the one-child policy and the strong son preference. The SRB even jumps by 23 percentage points between two- and three-abortion women. Zero and one-abortion women also have slightly higher SRB compared to the normal range, while women with 5+ abortions have a value of SRB within the normal range. The patterns of SRB across socio-demographic groups of women (data not shown) suggest that many women are experiencing abnormal SRB. Only the youngest women, women experiencing their first pregnancy, women of minority nationality and college-plus educated women had an SRB more or less within the normal range. Table 4.11 demonstrates more clearly the extent of the influence of abortion on SRB.

Figure 4.12 Number of abortions and sex ratio at birth, China, 1997 NDRHS



Source: 1997 NDRHS computer record data file.

Table 4.11 Effect of prior children on induced abortion at the next pregnancy

Prior children		Women	Women	Male	Female	Induced	Per cent	Per cent	Abortion	Sex ratio
Number	Sex	at risk	conceived	births	births	abortions	conceived	live-born	ratio	at birth
0		12518	12157	5554	5378	459	97.12	89.92	4.20	103.27
1	boy	5554	4191	1398	1372	1264	75.46	66.09	45.63	101.90
	girl	5378	4282	1736	1300	1072	79.62	70.90	**35.31**	**133.54**
	abortion	459	426	165	156	58	92.81	75.35	18.07	105.77
2	2 boys	1398	667	219	243	187	47.71	69.27	40.48	90.12
	1 boy + 1 girl	3108	1475	547	529	344	47.46	72.95	31.97	103.40
	2 girls	1300	964	494	300	124	74.15	82.37	**15.62**	**164.67**
	1 boy + 1 abortion	1429	720	115	135	446	50.38	34.72	178.40	85.19
	1 girl + 1 abortion	1228	653	184	120	322	53.18	46.55	105.92	153.33
	2 abortions	58	49	18	17	10	84.48	71.43	28.57	105.88

Source: 1997 NDRHS computer record data file.

The number and sex of the children that women had already borne largely determined the subsequent incidence of conception and abortion, hence the SRB. Conception and childbearing is universal in China, and in the sample population, 97.1 per cent had conceived and most of them had already borne a child. As the first child is not regulated by policy, very few women have their first child aborted, the AR of the first birth is only 4.2 per cent, and people do not care about the sex of their first child, the subsequent SRB stands at 103.3. However, as influenced by the one-child policy and sex preference, women usually decide to have the next conception according to the sex of the first child. Once the sex of the conceived child is known, a decision will be made about the fate of the pregnancy. In Table 4.11, 75.5 per cent of women who have a male child had the second conception, while 80 per cent of women having a daughter had the second pregnancy. Generally a balanced sex combination of children is preferred in China, though son preference is much stronger than daughter preference. So couples who have a daughter definitely want to have a son, and couples who have a son may want to have a daughter. SRB of 101.9 for women having one son indicates some extent of daughter-preferred sex-selective abortion, while SRB of 133.5 for women having a daughter shows a strong son preference in selection by abortion. One-daughter women are more likely to carry their second pregnancy to term, and less likely to terminate the pregnancy than are women with one living son. If the first pregnancy was aborted, SRB from the second pregnancy stood exactly normal at 105.8.

A more marked pattern of sex preference existed for women who have two children according to the sex combination of their children. Women who have a son and a daughter are satisfied, while those who have two sons or two daughters will still want to have a child of the opposite sex, with those having only daughters desiring much more strongly to have a son. Of daughter-only women, 74 per cent conceived again and 82 per cent of the pregnancies resulted in live births, with a surprisingly high SRB of 164.7, indicating a very strong desire and realization of having a son. Women with one son and one daughter had a within-normal-range SRB of 103.4 at the third birth, while son-only women had an abnormally low SRB of 90.1, also indicating a fairly strong preference for a daughter. Women with one child and one abortion exhibited a similar pattern of the next child's sex preference according to the sex of their child, while two-abortion women had a normal SRB of 105.9 as this is their first child. Surprisingly, a fairly high proportion of two-children women conceive and give birth again despite the

fact that a third child is prohibited by the family planning policy in any situation in China, except for some of the minority-nationality populations.

When the pattern of abortion reason and gestation is broken down by the number and sex of previous children a woman has, the notion of sex preference is further revealed. As shown in Table 4.12, the most recent abortion obtained by women with two girls is more likely to be a result of policy restriction than of other reasons. Women with one girl also had a higher proportion of the last abortion resulting from policy restriction than did women with one boy. Correspondingly women with daughters only were more likely to have the last abortion in second trimester.

Table 4.12 Percentage distribution of the last abortion by reason and gestation according to women's number and sex of previous children, China, 1997 NDRHS

Number and sex of previous children	Abortion reason				Gestation		Cases
	Contraceptive failure	Personal reasons	Policy restriction	Others	First trimester	Second trimester	
No previous children	7.20	41.33	40.00	11.47	79.47	20.53	375
One boy	49.40	11.05	32.18	7.37	85.79	14.21	1330
One girl	43.77	11.37	36.10	8.75	82.85	17.15	1108
Two boys	36.52	17.83	36.96	8.70	74.35	25.65	230
Two girls	36.18	17.11	41.45	5.26	71.05	28.95	152
One boy and one girl	39.50	15.75	39.50	5.25	73.74	26.26	438

Source: 1997 NDRHS computer record data file.

4.7 Concluding Remarks

In China, induced abortion occurs among virtually all subgroups of women. The extent to which women obtain induced abortion is, in all likelihood, determined by both their background characteristics and the nation's parity-specific fertility policy. When practical contradictions persist between the country's demographic goals and couples' reproductive aspirations, extensive resort to induced abortion as well as effective contraceptive methods are demonstrably necessitated. However, this does not negate the circumstances in which women's enhanced socio-economic status results in appreciation of alternatives to frequent childbearing, thus increased willingness to undergo induced abortions especially over the last decade with substantial socio-economic transitions and value changes in China.

There are significant differences in the incidence of abortion across the social strata of women. Generally women with more 'modernized' characteristics have a higher incidence of abortion. Higher abortion rates are associated with higher education, higher income, urban residence, Han nationality, and pregnancies after first birth. On the one hand, these women typically have lower fertility desires; on the other hand, they are more likely to be using less effective contraceptive methods or even not using any contraceptives. Because of the parity-specific fertility policy in China, abortions are widespread among the women who have one or more births. The abortion rate descends abruptly after parity one. As China has one of the world's highest contraceptive prevalence rates (83.8 per cent among the married women in 1997), widespread abortions imply fairly low contraceptive effectiveness. As the data show, 40 per cent of the last abortions result from contraceptive failure. One important finding from my field survey in November 2002 in East China's Zhejiang Province is that informed choice of contraceptive methods, which is one of the major elements of the quality-of-care approach in family planning, was actually associated with increased abortions as women were choosing less effective methods rather than the previous regulation of IUD after the first birth and sterilization after the second birth.

The most frequently stated reason for obtaining the last abortion is contraceptive failure (40 per cent), followed by policy restriction (36 per cent) and personal (17 per cent) and other reasons (8 per cent). Conceptions resulting from contraceptive failure are unwanted, thus abortion is the only and normal resolution. The extent to which such abortions are voluntary is, however, difficult to ascertain. But abortions associated with personal considerations (such as health or employment) are performed on a totally voluntary basis. Policy restriction has ambiguous dimensions: many women wanted to have an additional child and were unaware that their pregnancies did not meet the policy requirements, and they obtained abortion voluntarily once informed, while some others had persuaded abortions; still some women knew they were running the risk of violating the policy but frequently their pregnancies were resolved by persuaded or coercive abortion. Abortion obtained by women with unauthorized pregnancies is peculiarly a Chinese pattern.

The majority of abortions in China (70-90 per cent) are first-trimester procedures across all the socio-demographic groups of women. The first-trimester abortions also tend to concentrate on 5-8 weeks of gestation (40-50 per cent). However, in rural areas and

with increasing parity, second-trimester abortions have been increasing, indicating some policy relevance. As the gestation-period issue is particularly sensitive in China, downward-biased misreporting on this question is possible, which may inflate the number of first-trimester abortions.

The 1997 survey also provides important although indirect evidence of the abnormally high sex ratio at birth resulting from sex-selective abortions in China. For women having one to two and three abortions, SRB jumps dramatically from 109 to 121 and 144. Across the social strata, women are pervasively experiencing abnormally high SRB. The number and sex of children women already have largely determines the subsequent incidence of conception and abortion. Data show that women with no previous births, with balanced-sex children or with all previous pregnancies aborted have a moderately high abortion rate and within-normal-range SRB at the next pregnancy, but women with sons only have a much higher abortion rate, while daughter-only women have a very low abortion rate but extremely high SRB.

Among the most consistent and sustained differentials is the urban-rural divide in abortion patterns in China. Not only were the family planning programs initiated in the big cities and urban areas, and abortion and contraceptive techniques were developed and utilized in urban areas as early as the 1960s and spread to the rest of the country gradually, but economic policies were also favoured for the cities before the 1980s, and the reform policy introduced in the late 1970s, although initiated in the rural areas, has been more effective and socio-economic changes more dramatic in urban China. The urban-rural gap has been increasingly and strongly established in nearly all aspects of social life in China. The same can be more or less applied to the regional development in family planning norms, fertility and abortion behaviour, and socio-economic conditions. Since China is so vast and diversified, sometimes making comparisons between China and some other countries is largely meaningless. Shanghai, whose population is large enough to be compared to that of many whole countries, has the world's lowest fertility while its abortion rate is among the highest in the world. Many of China's provinces have a population that is larger than most of the countries in the world. In the context of rapid socio-economic and demographic transition, both the mean and variance is central to China studies, particularly with respect to reproductive behaviour including abortion.

Chapter 5

Factors Affecting Induced Abortion in China

5.1 Introduction

The examination of abortion patterns and characteristics has demonstrated wide-ranging differentials in the incidence of abortion across various socio-demographic and economic variables. There are some similarities in the patterns of abortion differentials between China and the rest of the world, however, characteristics associated with China's unique family planning policy have been distinct and important in understanding the underlying patterns and observed trends. In shaping the abortion picture in China, both the individual characteristics of women and the broad context in which women are regulated are important. The incidence of abortion is highly correlated with women's socio-demographic and economic background, however, the incidence and the patterns have substantially varied over time and across regions, largely as a result of macro social and economic changes and the implementation of family planning policy.

This chapter examines the factors affecting induced abortion in China by three types of multivariate regression analysis. The first two analyses deal with the determinants of women's abortion incidence at the individual level (pregnancy-based likelihood of abortion and women-based lifetime abortion), addressing the question to what extent the effects of various socio-demographic variables identified by the bivariate analysis are maintained when the differing background characteristics are controlled. The models incorporate individual and community-level factors. In addition, there are two variables largely representing family planning policy effects. The third analysis will look at the influence on induced abortion of the broad socio-economic development and family planning policy implementation at the provincial level, and this will shed light on the understanding of women's abortion rate in general and parity-specific abortion rate in particular in China.

5.2 Likelihood of Abortion: Logistic Regressions

Chapter 4 has established the socio-economic and demographic patterns of induced abortion in China through bivariate analyses; that is, the covariates of abortion incidence have been analysed individually. Since many are themselves intercorrelated, it is therefore important to determine their relative independence and strength when analysed simultaneously. Logistic regression will be used in the multivariate analyses in this section.

Pregnancies are the unlit of analysis. The likelihood of abortion is modelled involving all the pregnancies that had been either carried to term or terminated by abortion. Most of the variables are of categorical nature. In the literature of applied statistics in the social sciences including demography, analysis of categorical data is typically addressed by log-linear models (Agresti 1990; Wang and Guo 2001). Logistic regression is a special form of log-linear models. When a dichotomous variable in a log-linear model is treated as a dependent variable and defined as a function of a set of independent variables, the log-linear model becomes a logistic regression (Agresti 1996). Logistic function is the underlying distribution of the random variable (dependent variable). However, an alternative approach is probit models, in which the underlying function of the dependent variable follows a cumulative normal distribution. These two virtually identical probability distributions establish the fact that results from logistical and probit models are rather similar.

Despite the fact that there is no sound theoretical basis for favouring the type of function to be used when addressing a dichotomous variable to be dependent upon other explanatory variables, and there are no substantive differences in the results, there are advantages to logistic regression in modelling categorical data in social sciences. When the observations are highly skewed towards the two ends of the distribution, logistic regression is a more appropriate method (Liao 1994; Wang and Guo 2001). In addition, logistic regression results are more straightforwardly interpreted through odds ratios, which are not available from the results of a probit model. For these two reasons, as well as the customary practice of use of logistic analysis addressing the binary dependent variables in demography, the likelihood of abortion in this section is modelled by logistic regressions. Note that the distribution of pregnancies in these analyses is highly skewed towards live births.

The basic equation of the logistic regression is:

$$\ln\left(\frac{p}{1-p}\right) = b_0 + b_1X_1 + b_2X_2 \ldots b_nX_n$$

where the dependent variable, the likelihood of induced abortion, is specified in terms of the odds of a pregnancy terminated by induced abortion, $\frac{p}{1-p}$; the variables X_i (i=1, 2, ..., n) on the right-hand side of the equation represent a range of independent variables. When the independent variables are categorical, they are specified as dummy variables.

There are in total 14 independent variables in the logistic regression models. Table 5.1 presents variable specifications and the mean and standard error of the variables in the models; see Tables 4.5 and 4.8 in Chapter 4 for the frequency distribution and the abortion pattern across these variables. For a categorical variable, the mean value in Table 5.1 is interpreted as the percentage of the cases in the particular dummy category among the total variable cases. For example, the mean value for the dependent variable 'Induced abortion' in the all-women models is 0.19, which means that among total pregnancies, 19 per cent were terminated by induced abortion. For rural areas, 15 per cent of the pregnancies were terminated by induced abortion.

It should be pointed out that the three regions of China (East, Central and West) are classifications by the State Family Planning Commission according to the strength and performance of the family planning policy. Most of the provinces are located in the region to which they belong, but a few cases are not. Fujian, Guangdong and Hainan are East China provinces, but they are not included in the East China region. Fujian and Guangdong are put in the Central China region, and Hainan in the West China region. The West China provinces Sichuan and Chongqing are relocated to the East China region. In addition, the West China provinces Shaanxi, Guangxi and Inner Mongolia are moved to the Central China region. Thus the regional categories are in fact a reflection of policy strength categories: East China represents the strongest policy strength category, Central China the moderate category and West China the weakest

category. The inclusion of this variable, to a large extent, captures the effect of family planning policy on abortion incidence, in addition to the policy period variable.

Table 5.1 Variable specifications, and mean and standard deviation of the variables in the logistic regression models

	All women		Rural women	
Variables	**Mean**	**S.D.**	**Mean**	**S.D.**
Induced abortion	0.19	0.39	0.15	0.36
Age at which the pregnancy is finished	24.90	3.99	24.64	3.99
Residence (Ref=Rural)				
Urban	0.19	0.39		
Ethnic group (Ref=Minority)				
Han nationality	0.90	0.31	0.89	0.32
Education (Ref=Illiterate)				
Primary school	0.33	0.47	0.37	0.48
Junior middle school	0.25	0.43	0.22	0.41
Senior middle school	0.09	0.29	0.04	0.20
College or over	0.02	0.15	0.00	0.02
Parity	1.45	0.96	1.52	0.99
Number of prior abortions	0.25	0.61	0.21	0.57
Pregnancy interval	29.02	22.15	29.27	21.50
Policy period (Ref=Before 1980)				
1980-89	0.45	0.50	0.45	0.50
1990-97	0.30	0.46	0.30	0.46
Region (Ref=West China)				
East China	0.37	0.48	0.34	0.47
Central China	0.51	0.50	0.54	0.50
Topography (Ref=Other)				
Plain			0.41	0.49
Source of drinking water (Ref=Other)				
Tap water			0.29	0.45
Electricity (Ref=No)				
Yes			0.97	0.16
Distance (Ref=40 kilometers or over)				
Below 20 kilometers			0.41	0.49
20-39 kilometers			0.34	0.47
Income (Ref=Below 1000 yuan)				
1000-1999 yuan			0.42	0.49
2000-2999 yuan			0.24	0.42
3000 yuan or over			0.10	0.30

Note: Ref=Reference category. Age, parity, prior abortion number and pregnancy interval are interval variables, all others are categorical.
Source: 1997 NDRHS computer record data file.

Table 5.2 Logistic regressions of effect of socio-economic and demographic factors on the likelihood of abortion

Independent variables	All women					
	Model 1			Model 2		
	B	OR	SOR	B	OR	SOR
Urban residence	0.76	2.14***	2.14	1.26	3.51***	1.61
Han nationality	0.22	1.24***	1.24	0.36	1.44***	1.12
Primary school	0.40	1.49***	1.49	0.49	1.63***	1.26
Junior middle school	0.58	1.79***	1.79	0.88	2.41***	1.44
Senior middle school	0.70	2.02***	2.02	1.27	3.55***	1.42
College or over	0.68	1.97***	1.97	1.42	4.13***	1.21
1980-89	0.64	1.88***	1.89	0.86	2.36***	1.54
1990-97	1.07	2.90***	2.91	1.49	4.45***	1.98
East	0.72	2.05***	2.05	1.19	3.28***	1.76
Central	0.06	1.06	1.06	0.22	1.25***	1.12
Age	0.12	1.13***	1.13	0.03	1.03***	1.14
Parity				0.44	1.55***	1.50
Prior abortions				0.35	1.42***	1.23
Pregnancy interval				-0.26	0.77***	0.65
Model Chi-square		3832.28***			4450.64***	
Pseudo R-square		0.13			0.21	
Degree of freedom		11			14	
Number of cases (N)		30570			18557	

Note: B=coefficient, OR=odds ratio. SOR=standardized odds ratio. Calculated using STATA 7.0.
*p<0.05, **p<0.01, ***p<0.001.
Source: 1997 NDRHS computer record data file.

Table 5.2 (continued)

Independent variables	Rural women					
	Model 3			Model 4		
	B	OR	SOR	B	OR	SOR
Han nationality	0.12	1.12	1.04	0.19	1.21**	1.07
Primary school	0.32	1.38***	1.17	0.41	1.51***	1.22
Junior middle school	0.40	1.49***	1.18	0.62	1.87***	1.28
Senior middle school	0.54	1.72***	1.12	0.84	2.31***	1.18
College or over	-0.43	0.65[a]	0.99	-0.35	0.70[a]	0.99
1980-89	0.76	2.14***	1.46	0.91	2.48***	1.57
1990-97	1.27	3.57***	1.79	1.66	5.27***	2.14
East	1.10	3.02***	1.69	1.53	4.61***	2.05
Central	0.20	1.22**	1.10	0.38	1.46***	1.21
Age	0.11	1.12***	1.56	0.02	1.02***	1.08
Parity				0.45	1.56***	1.52
Prior abortions				0.44	1.55***	1.28
Pregnancy interval				-0.31	0.74***	0.62
Plain	-0.26	0.77***	0.88	-0.18	0.84***	0.92
Tap water	0.15	1.16***	1.07	0.25	1.28***	1.12
Electricity	0.54	1.71***	1.09	0.51	1.66***	1.09
Below 20 kilometers	0.32	1.37***	1.17	0.28	1.32***	1.15
20-39 kilometers	0.15	1.16**	1.07	0.12	1.13**	1.06
1000-1999 yuan	-0.02	0.98	0.99	0.00	1.00	1.00
2000-2999 yuan	0.06	1.06	1.03	0.09	1.09	1.04
3000 yuan or over	0.39	1.48***	1.12	0.44	1.55***	1.14
Model Chi-square		2280.55***			2687.58***	
Pseudo R-square		0.11			0.18	
Degree of freedom		18			21	
Number of cases (N)		24665			15301	

Note: B=coefficient, OR=odds ratio. SOR=semi-standardized odds ratio. [a]only six cases and only one abortion this category. Calculated using SPSS 11.0.
*p<0.05, **p<0.01, ***p<0.001.
Source: 1997 NDRHS computer record data file.

The hypotheses to be tested by the logistic regressions are as follows. Women of higher socio-economic status, in terms of both their individual and community characteristics, are more likely than their counterparts to have an induced abortion when a pregnancy occurs. In addition, women's previous reproductive experiences with respect to children ever born and abortions ever obtained are also positively associated with their later abortion incidence when controlling for their socio-economic characteristics.

Results of two types of models are presented in Table 5.2. Models 1 and 3 examine the socio-economic factors affecting induced abortion, while Models 2 and 4 are run with inclusion of three additional demographic variables: parity, prior abortion number and pregnancy interval. A comparison between the models (model 1 versus 2 and model 3 versus 4) reveals that the logit coefficients and odds ratios in most cases increased substantially after controlling for the demographic variables.

While interpretation of logit coefficients can be easily stated, it is not so easily understood, thus a preferred interpretation of the coefficients is in terms of odds ratios. Odds ratios are exponentiation of the values of the coefficients, which may be interpreted as follows: for each unit increase in the independent variable, the odds are multiplied by its exponentiated coefficient. The percentage change in the odds with one unit change in the explanatory variable can be computed, suggesting a more straightforward interpretation. For example, urban residence has an odds ratio of 2.1, meaning that urban women are as twice as likely as rural women to obtain an abortion when a pregnancy occurs. Or urban women have odds of obtaining an abortion that are 100 per cent greater than those of rural women, holding all other variables constant.

The associations between abortion and socio-economic and demographic characteristics observed in bivariate analyses are largely held in the multivariate context. Urban and Han women are significantly more likely to abort their pregnancies than are rural and minority-nationality women. The likelihood of induced abortion increases sharply with women's education when controlling for other variables. The variables indicating the effect of the one-child policy and time period suggest that the likelihood of induced abortion has doubled, on average, each decade. Women in East China are three times more likely than women in West China to obtain an abortion net of the effect of other variables.

The 'parity' variable suggests that the likelihood of induced abortion increases, on average, by roughly 50 per cent with every addition to the number of children a woman has. The greater the number of her children, the more likely a woman is to have an abortion if she becomes pregnant again. A woman's prior abortion experience significantly increases the probability of obtaining the next abortion when she becomes pregnant again. With each additional prior abortion, a woman is 44 per cent more likely to abort the next pregnancy. The likelihood of induced abortion decreases significantly with the length of the pregnancy interval, implying that women are more likely to

choose to have an abortion when pregnancy occurs within a short interval after the previous pregnancy.

Rural community-level characteristics also have a significant effect on women's abortion incidence. When controlling for women's individual characteristics, the likelihood of induced abortion is significantly higher in more than less developed rural communities. However, only the highest-income communities have a significant odds ratio, implying that there seems to be a threshold for income to affect significantly the abortion probability. The 'plain' variable, however, indicates that rural villages situated in plains areas have lower abortion rates than villages of mountainous or other topography, which is contrary to the bivariate relationship observed earlier. On the one hand, topography is not fully representative of development level; on the other hand, some of the provinces with very low fertility and high abortion rates but representing markedly different development level, notably Beijing, Zhejiang, Sichuan and Chongqing, are largely mountainous.

For the most part, the multivariate results agree with the bivariate results presented in Chapter 4 and support the hypotheses specified earlier. Recourse to induced abortion is more common among women who are more educated and are of higher socio-economic status, among higher-parity women, those with greater number of prior abortions and those with a shorter pregnancy interval. Such patterns hold for all women as well as for rural women. In addition, the likelihood of induced abortion for a rural woman is affected by the characteristics of the rural community to which she belongs. Recourse to induced abortion is more common in more developed villages.

The relative importance of the covariates can be assessed by raising the odds of each covariate to the power of one standard deviation (Rabe-Hesketh and Everitt 2000: 155). Such semi-standardized odds ratios are presented in the last column of each model. Although there is a problem in the interpretation of the meaning of semi-standardized odds ratios when the covariate is a dummy variable, their values nevertheless indicate the relative effects of the covariates on the odds of obtaining an abortion when a pregnancy occurs (Poston 2002: 342).

The semi-standardized odds ratios indicate that the most influential covariates are the variables indicating time and place (place of residence and region), followed by women's reproductive experience, socio-economic characteristics, and for rural women, the rural community characteristics. Variables indicating time and place mirror

both the implementation (and strength) of the family planning program and the macro socio-economic development. Past reproductive experiences reflect both the influence of the parity-specific family planning policy and women's own fertility desires. Women's socio-economic and community characteristics are largely the immediate socio-economic conditions influencing women's reproductive behaviour. Urban-rural differentials and regional variations are highlighted, while other socio-economic variables remain also significantly influential. An interesting and important observation is that the all-women models have higher odds ratios for education and nationality variables, while the odds ratios for period and region (policy strength) are markedly higher in the rural-women model, suggesting that urban women are more affected by their own socio-economic characteristics and rural women by contextual forces. This finding is consistent with the fact that there are more substantial variations in rural than urban fertility across the regions in China.

5.3 Lifetime Abortion: Ordered-Logit Models

In the literature of Chinese fertility analysis, a wide range of regression models have been applied to examine the determinants of fertility depending on the conceptualization of the hypotheses and the nature and categorization of both the dependent and the independent variables (see for example Birdsall and Jamison 1983; Lin 1986; Jiang 1986; Poston and Gu 1987; Peng and Huang 1993; Sun and Jin 1994; Hao et al. 1994; Poston 2002). However, traditionally and most frequently, Ordinary Least Squares (OLS) regression technique is used when the dependent variable is a continuous variable. Demographic data on the number of children ever born, number of abortions and number of migrations etc. are discrete rather than continuous. They are actually 'event count' or 'count' data, which refer to the number of times an event occurs and is the realization of a non-negative integer-value random variable (Cameron and Trivedi 1998:1). For the demographic count variables, distribution is typically abnormal, that is, often heavily skewed with a long right tail. Thus the assumptions of normal distribution and a constant error variance in the OLS method are rarely met in such event-count variables. As Winkelmann and Zimmermann (1994) point out, if the dependent variable is discrete, the OLS model can only be an approximation to the data generation process; they consider the generalized count and ordered-response models to be potentially better specifications for demographic data. Using an OLS model to predict a count outcome will often result in inefficient, inconsistent and biased estimates of the regression parameters (Long 1997: 217).

The two procedures modelling count variables, namely Poisson regression and ordered-logit models, have been used in a number of recent studies of fertility (Winkelmann and Zimmermann 1994; Nguyen-Dinh 1997; Yohannes 2001; Poston 2002). However, the equi-dispersion (equality of the mean and variance) assumption inherent in Poisson regression is rarely met in demographic count data, as this property results from the assumption in the Poisson distribution of independence among events. In demography, however, future fertility is not independent from past fertility, and particularly in China, the next birth or abortion is heavily dependent upon the previous ones in the context of the strict family planning policy.

Ordered-logit, namely ordinal logistic regression, is used to estimate relationships between an ordinal dependent variable and a set of independent variables (Poston 2001a). Ordinal variables are common in social sciences including demography. Health status classified as 'poor', 'good' and 'excellent', education categorized as 'illiterate', 'primary' and 'secondary plus', and fertility grouped as 'low', 'moderate' and 'high' are some of the typical examples. When the number of children ever born or the number of abortions is regrouped as 'none', 'some' and 'lots', they are ordinal. Non-negative integer-value of the number of children ever born or the number of abortions is also ordinal. In the 1997 survey, the number of abortions ranges from none to eight, which can be viewed as an ordinal variable with nine categories. A recent fertility analysis in Vietnam (Nguyen-Dinh 1997) has examined the socio-economic determinants of the number of children ever born using OLS, Poisson and ordered-logit models simultaneously and compares these three results. The comparison shows that the ordered-logit model does somewhat better than either the OLS or the Poisson model; however, the estimated effects of many variables are similar for the Poisson and ordered-logit models but differ substantially from the OLS results. The present analysis of the lifetime abortion has a similar situation, hence the results from the ordered-logit models are reported.

The objective of the analysis is to examine the effect of the various socio-demographic and economic variables on the number of abortions while controlling women's background characteristics. The dependent variable is the number of induced abortions women have experienced up to the survey time. The general hypothesis is that women with more 'modernized' characteristics will have a larger number of induced abortions when several other independent variables are controlled. The basic equation of the ordered logistic regression is:

$$\ln\left(\frac{p(Y \le j)}{1-p(Y \le j)}\right) = b_0 + b_1X_1 + b_2X_2 \ldots b_nX_n$$

where the dependent variable, number of abortions ever obtained, is specified in terms of the odds of a cumulative probability of women obtaining *jth* abortion, $\frac{p(Y \le j)}{1-p(Y \le j)}$; the variables X_i (i=1, 2, …, n) on the right-hand side of the equation represent a range of independent variables. When the independent variables are categorical, they are specified as dummy variables.

Table 5.3 presents bivariate relationships between lifetime abortions and women's individual and community characteristics calculated from the 1997 survey. The patterns are similar to the socio-economic differentials in the likelihood of abortion reported in Chapter 4. Both women's individual and community characteristics have marked effects on lifetime fertility and abortion. Women of higher socio-economic status are more likely to obtain an abortion when a pregnancy occurs, hence they have a greater number of lifetime abortion (and smaller number of children even born). Three ordered-logit models are run for both all women and rural women to test the significance and net effect of the range of the socio-economic variable with statistical controls. Table 5.4 shows the descriptive statistics of the variables specified in the models. There are four independent variables in the first model: place of residence, nationality, education, and region. Two additional variables, age and the number of conceptions, are entered as control variables. The four independent variables are all categorical variables and are thus recoded as dummy variables. In the second model, six variables representing women's knowledge and attitudes on reproductive health are entered to test their significant effects on women's lifetime abortions while controlling for all the variables in model 1. Finally in model 3 for rural women, effects of community characteristics are examined with controls for rural women's individual socio-economic characteristics.

Table 5.5 shows the results of the ordered-logit estimates of the effects of the socio-demographic and economic variables on women's lifetime abortions. The ordered-logit model estimates the probability of a random variable falling in the ranges determined by ancillary parameters, also called cutting points. In the present analysis, the maximum number of abortions is eight and grouping is not used, so there are eight cutting points. A disadvantage of the ordered-logit model is the difficulty in interpreting its coefficients, but a preferred interpretation of the coefficients is in terms of odds ratios.

Table 5.3 Lifetime fertility and abortions (mean value) by women's individual and community characteristics, China, 1997 NDRHS

Characteristics	All women			Rural women		
	Pregnancies	Live births	Induced abortions	Pregnancies	Live births	Induced abortions
Age						
15-19	1.13	0.87	0.19	1.13	0.93	0.13
20-24	1.38	1.06	0.23	1.38	1.08	0.22
25-29	1.82	1.35	0.39	1.86	1.43	0.34
30-34	2.41	1.81	0.50	2.51	1.98	0.42
35-39	2.71	2.04	0.55	2.91	2.34	0.44
40-44	3.01	2.27	0.59	3.19	2.56	0.47
45-49	3.55	2.87	0.50	3.71	3.15	0.36
Place of residence						
rural	2.63	2.12	0.39			
urban	2.23	1.32	0.80			
Nationality						
Han	2.51	1.90	0.49	2.60	2.08	0.40
minority	2.87	2.32	0.38	2.93	2.43	0.33
Education						
illiterate	3.09	2.60	0.33	3.08	2.60	0.32
primary	2.58	2.04	0.41	2.57	2.05	0.39
junior high	2.21	1.57	0.54	2.23	1.69	0.44
senior high	2.20	1.35	0.76	2.49	1.81	0.59
college+	2.00	1.05	0.87	2.00	1.67	0.17[a]
Region						
East	2.37	1.64	0.63	2.46	1.79	0.56
Central	2.59	2.09	0.39	2.66	2.23	0.30
West	2.95	2.40	0.39	3.10	2.65	0.27
Topography						
Plain				2.53	2.01	0.40
Other				2.71	2.19	0.38
Source of drinking water						
Tap water				2.60	2.04	0.44
Other				2.65	2.15	0.37
Electricity						
Yes				2.63	2.10	0.40
Other				2.89	2.60	0.17
Distance (km)						
Below 20				2.62	2.04	0.46
20-39				2.61	2.11	0.38
40 or over				2.68	2.25	0.30
Income (yuan)						
Below 1000				2.90	2.41	0.33
1000-1999				2.57	2.10	0.35
2000-2999				2.56	2.00	0.44
3000 or over				2.54	1.83	0.59
Total	2.54	1.94	0.48	2.63	2.12	0.39

[a] only six women and one abortion in this category.
Source: 1997 NDRHS computer record data file.

Table 5.4 Variable specifications, and mean and standard deviation of the variables in the ordered-logit models

	All women		Rural women	
Variables	**Mean**	**S.D.**	**Mean**	**S.D.**
Number of induced abortions	0.48	0.81	0.39	0.76
Age (in years)	35.26	7.65	34.94	7.74
Number of pregnancies	2.54	1.33	2.63	1.37
Residence (ref=Rural)				
Urban	0.22	0.41		
Ethnic group (ref=Minority)				
Han nationality	0.91	0.29	0.90	0.30
Education (ref=Illiterate)				
Primary school	0.32	0.47	0.38	0.49
Junior middle school	0.29	0.45	0.26	0.44
Senior middle school	0.11	0.31	0.05	0.21
College or over	0.03	0.17	0.00	0.03
Region (ref=West China)				
East China	0.39	0.49	0.36	0.48
Central China	0.50	0.50	0.53	0.50
Training before marriage (ref=No)				
Yes	0.09	0.29		
Abortion does harm to health (ref=No)				
Yes	0.81	0.40		
Agree with premarital sex (ref=No)				
Yes	0.14	0.35		
Experience of contraceptive failure (ref=No)				
Yes	0.25	0.43		
Postpartum contraception (ref=No)				
Yes	0.53	0.50		
Provide services to unmarried (ref=No)				
Yes	0.55	0.50		
Topography (ref=Other)				
Plain			0.42	0.49
Source of drinking water (ref=Other)				
Tap water			0.29	0.45
Electricity (ref=No)				
Yes			0.98	0.16
Distance (ref=40 km or over)				
Below 20 km			0.41	0.49
20-39 km			0.34	0.48
Income (ref=Below 1000 yuan)				
1000-1999 yuan			0.43	0.49
2000-2999 yuan			0.24	0.43
3000 yuan or over			0.10	0.31

Source: 1997 NDRHS computer record data file.

Table 5.5 Ordered-logistic regressions of effect of socio-economic factors on lifetime abortion

Independent variables	All women						Rural women		
	Model 1			Model 2			Model 3		
	B	OR	SOR	B	OR	SOR	B	OR	SOR
Urban residence	1.49	4.42***	1.85	1.41	4.11***	1.85			
Han nationality	0.51	1.66***	1.16	0.40	1.49***	1.12	0.21	1.23*	1.07
Primary school	0.85	2.35***	1.49	0.73	2.08***	1.41	0.56	1.76***	1.32
Junior middle school	1.35	3.88***	1.85	1.16	3.19***	1.72	0.80	2.23***	1.42
Senior middle school	1.72	5.61***	1.70	1.38	3.96***	1.58	1.22	3.38***	1.29
College or over	1.84	6.31***	1.36	1.47	4.34***	1.31	-0.15	0.86[a]	1.00
East	1.40	4.05***	1.98	1.25	3.49***	1.86	2.00	7.41***	2.62
Central	0.36	1.43***	1.20	0.27	1.31*	1.14	0.68	1.98***	1.41
Age	0.05	1.05	1.47	-0.01	1.01	0.91	0.04	1.04	1.38
Age square	0.00	1.00***	0.36	0.00	1.00*	0.58	0.00	1.00***	0.31
Number of pregnancies	1.46	4.31***	7.02	1.43	4.17***	6.66	1.38	3.98***	6.58
Training before marriage				-0.04	0.96	0.99			
Abortion does harm to health				-0.67	0.51***	0.77			
Agree with premarital sex				0.44	1.56***	1.17			
Experience of contraceptive failure				2.08	8.02***	2.53			
Postpartum contraception				0.16	1.18**	1.08			
Provide services to unmarried				0.10	1.11*	1.05			
Plain							-0.14	0.87*	0.94
Tap water							0.24	1.27***	1.11
Electricity							0.62	1.87**	1.10
Below 20 km							0.42	1.53***	1.23
20-39 km							0.26	1.30***	1.13
1000-1999 yuan							0.10	1.10	1.05
2000-2999 yuan							0.20	1.22*	1.09
3000 yuan or over							0.71	2.04***	1.24
Model Chi-square	5743.49***			5950.98***			3683.42***		
Pseudo R-square	0.26			0.36			0.24		
Degree of freedom	11			17			18		
Number of cases (N)	12013			8329			9364		

Note: B=coefficient, OR=odds ratio, SOR=semi-standardized odds ratio. [a]only six cases and only one abortion in this category. Calculated using STATA 7.0.
*p<0.05, **p<0.01, ***p<0.001.
Source: 1997 NDRHS computer record data file.

In a summary way, the ordered-logit model results again provide support to the hypothesis that induced abortion (repeated abortion) is more likely to occur among the urbanized, Han-nationality and higher-educated women. Women in East and Central China are more likely to obtain induced abortion than those from West China. Age is not linearly related to the number of abortions. And as expected, number of pregnancies is positively related to the number of abortions.

Model 1 shows the effects of women's background characteristics. Urban residence has an odds ratio of 4.4, meaning that urban women are 4.4 times more likely than rural women to be in a higher-number-of-abortions category, holding all other variables constant. The odds of the Han majority nationality women being in a higher-number-of-abortions category is 66 per cent larger than that of the minority-nationality women. The higher women's education, the greater their odds of being in a higher-number-of-abortions category compared to the reference group (illiterate women), and women with college-plus education are six times more likely than the illiterate women to be in a higher-number-of-abortions category. While East and Central China both have an odds ratio greater than one, East China contrasts sharply to West China as well as to Central China. Women in East China are four times more likely to obtain (repeated) abortions than those in West China, demonstrating the strong effect of policy strength. Age coefficient is not statistically different from zero, while quadratic effect of age is statistically significant though small. Finally, for every additional pregnancy, the odds will be four times greater in a higher-number-of-abortions category.

Model 2 in Table 5.5 presents an ordered-logit model extending the first model by including some of the variables relating to women's reproductive knowledge and attitudes, examining the effect of the knowledge and attitudinal variables when controlling for women's background characteristics. There are six knowledge and attitudinal variables: (1) 'Training before marriage' addresses the question whether the woman or her husband attended a training course on marriage, sex, contraception and childbearing before they got married. It is hypothesized that women or their husbands who attended this training should have a better knowledge of contraception and are more aware of the health consequences of induced abortion, which could be favourable to avoiding induced abortions. (2) 'Abortion does harm to health' addresses the question to what extent induced abortion affects women's health, and the hypothesis is

that women who are aware of the health risk should be less likely to experience induced abortions. (3) 'Agree with pre-marital sex' addresses the question whether the woman agrees with having premarital sex when the partners have decided to marry. It is hypothesized that those who agree with this view should be more likely to have had premarital sex that is not necessarily protected, hence they are more likely to have experienced induced abortions. (4) 'Experience of contraceptive failure' addresses the question whether the woman has experience of contraceptive failure that led to conception. The hypothesis is that women having experience of contraceptive failure are more likely to terminate the pregnancy with induced abortion. (5) 'Postpartum contraception' addresses the question whether contraception should be used between the birth of a child and the next menstruation. It is hypothesized that women who think it necessary are more likely to have experienced induced abortion as a result of no contraception or contraceptive failure. (6) 'Provide services to unmarried' addresses the question whether contraceptive knowledge and methods should be provided to unmarried young people, and it is hypothesized that those who think it necessary are more likely to have experienced induced abortion as a result of having unprotected sex or contraceptive failure.

The results in Model 2 show that there are no significant effect of training before marriage on the subsequent experience of induced abortion, while all other knowledge and attitudinal variables have statistically significant effect on the number of induced abortions women have experienced. Women who are aware of the health consequences of induced abortion have odds of being in a higher-number-of-abortions category that are 49 per cent less than those who are not aware. Women agreeing with premarital sex are 1.6 times more likely to be in a higher-number-of-abortions category. Women with experience of contraceptive failure have the odds of being in a higher-number-of-abortions category that is eight times greater than those without the experience. Women who think postpartum contraception necessary are 18 per cent more likely to be in a higher-number-of-abortions category than those who think it not necessary. Finally women who think necessary to provide family planning services to the unmarried have 11 per cent greater odds of being in a higher-number-of-abortions category than those who think it not necessary. These results suggest important policy implications for reducing induced abortion by meeting the unmet needs through providing better reproductive health education and services.

Model 3 demonstrates the significant effect of rural community characteristics on women's lifetime abortions. All variables but 'plain' have an odds ratio greater than one, and except for '1000-1999 yuan' income, their effects are all statistically significant. Women in more developed rural communities are more likely to have repeated abortions than are women in less developed communities.

The semi-standardized odds ratios indicate that the most influential covariate is the number of pregnancies, followed by region (policy strength), place of residence, education and nationality. Among the variables representing women's knowledge and attitudes, experience of contraceptive failure is the most important, and its influence even overrides all other socio-economic variables. Two other relatively important variables are awareness of health consequences of induced abortion and attitude towards premarital sex. The most influential community-level variables are income and distance to county seat. Thus when development and family planning policy tend to contribute to increased abortion rates, improved contraceptive effectiveness and services are vital to reduce abortion incidence and repeated abortions.

Again as observed in last section, the all-women models have higher odds ratios for education and nationality variables, while the odds ratio for region (policy strength) is markedly higher in the rural-women model. Also interesting is that odds ratios in Table 5.5 in most cases are markedly higher than the corresponding odds ratios from Table 5.2. The differences are mainly due to the nature of the unit of analysis in the two types of models. Pregnancies are the unit of analysis in models from Table 5.2, while the present models use women as the unit of analysis. Pregnancies terminated by abortion and repeated abortions tend to cluster on women of higher socio-economic status, leading to higher odds ratios than pregnancy-based models.

5.4 Determinants of Induced Abortion at Provincial Level: Factor Analysis

In the literature of Chinese fertility studies, the widely held argument is that China's rapid fertility decline including the growth of induced abortion is mainly associated with the coercive implementation of the family planning policy, while the socio-economic factors underlying fertility transition elsewhere have played only a minor role in China (see discussion in Yang 1994). Some other studies, while acknowledging the dominant role of the family planning policy, also emphasized the importance of China's socio-economic development by noting that the level of socio-economic development and implementation of the family planning policy have been largely interrelated and been mutually reinforcing (Poston and Gu 1987; Lin 1987; Lin and Liu 1997; Jiang 1986; Peng and Huang 1993). The question that will be addressed in this section is to what extent both the socio-economic development and family planning affected the incidence of induced abortion in China, and to what extent their contributions differed at different parity. The above sections have identified and examined the significant factors affecting women's abortion incidence and lifetime abortions; however, women have been obtaining induced abortions in the context of China's socio-economic development and family planning policy. Besides the individual-level factors, the broad development level and family planning policy should be also important in shaping the incidence of induced abortions at the regional level. Regional variations documented in Chapter 4, particularly in Figure 4.4, apparently support to this argument.

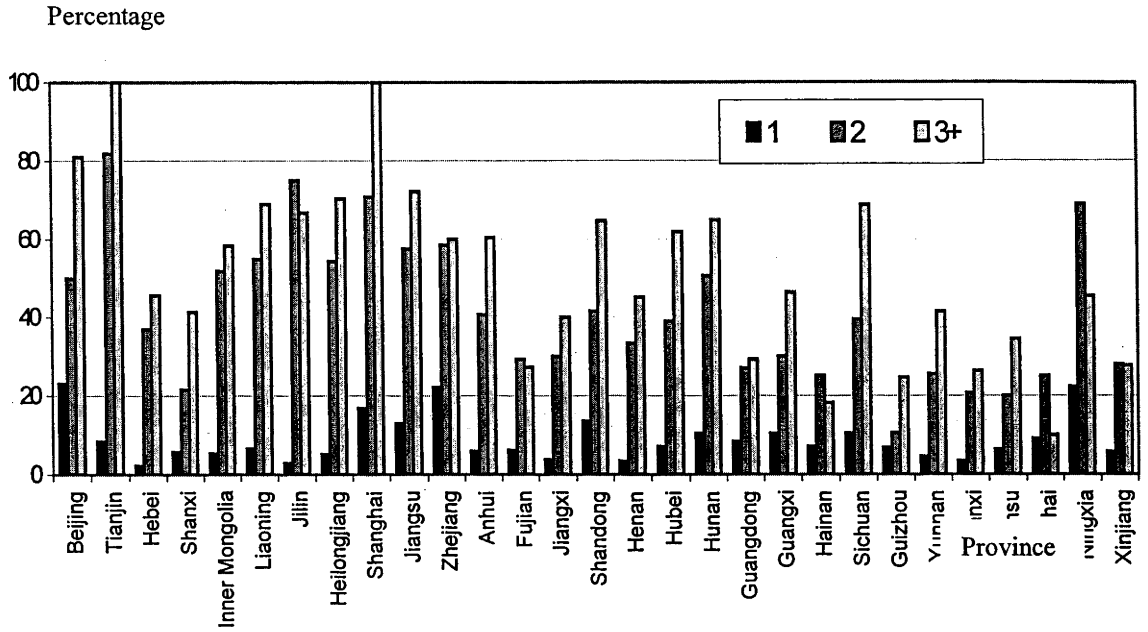
The hypothesises to be tested in this section are as follows. At the regional level, the incidence of induced abortion is determined by both the socio-economic development level and the strength of the family planning policy. In addition, the effects are parity-specific, and family planning policy has played a dominant role in the incidence of abortion at higher parities. In fertility studies, similar questions are addressed most commonly by multiple linear regression, and less frequently by path analysis and factor analysis. In this section, a combination of factor analysis and multiple linear regression is used to examine the effects of the socio-economic development and family planning policy on induced abortions in China at the provincial level.

The objective of factor analysis is to reduce data structure by representing a set of variables in terms of a smaller number of hypothetical factors (Guo 1999). One of the disadvantages of the multiple linear regression in fertility analysis is the difficulty and complexity of addressing the multicollinearity of the independent variables. Factor analysis can remove this complexity by compressing the highly overlapped data structure into a few statistically independent factors. Exploratory factor analysis is used in this section to examine and determine the constructs that might explain the intercorrelations among the variables common to the fertility and abortion studies. The statistically independent factors that are generated are tentatively named to represent the broad aspects of the socio-economic development. The results of the factor analysis are then used to represent the initial explanatory variables for a further analysis by multiple linear regression of the incidence of induced abortion at different parities across the regions.

The dependent variables for the analysis are the proportions of induced abortions among the total pregnancies at parity one, parity two and parity three plus across the provinces between 1992 and 1997, the five-year period preceding the survey time. Fifteen development variables shown in the literature to be influential in fertility changes are selected to represent comprehensively the various aspects of provincial social and economic structure. Four family planning variables are selected to show the capacity and strength of local governments to implement the family planning policy, and one variable is used as an indication of the political capacity of the local governments. All the social, economic and family planning variables are for 1995.

Figure 5.1 shows the proportions of induced abortions among the total pregnancies at parity one, parity two and parity three-plus across the provinces of China in the five-year period preceding the 1997 survey. For China as a whole, the proportion of pregnancies that were ended by induced abortion were 8 per cent, 39 per cent and 51 per cent respectively at parity one, parity two and parity three-plus between 1992 and 1997. So the incidence of abortions increased substantially from parity one to three-plus. However, most of the second pregnancies were carried to term, and still nearly half of the third-plus pregnancies were carried to term, suggesting a fairly substantial number of births which did not follow the requirements of the family planning policy.

Figure 5.1 Abortion proportion of total pregnancies at parity one, two and three plus, 1992-1997, 29 provinces of China



Source: 1997 NDRHS computer record data file.

At the provincial level, there are considerable variations, but generally higher abortion proportions occurred in the provinces that were either more economically developed or with greater force in family planning implementation. More than 20 per cent of the first pregnancies were aborted in three provinces (Beijing, Zhejiang and Ningxia), about 50-80 per cent of the second pregnancies were aborted in 10 provinces (Beijing, Shanghai, Tianjin, Zhejiang, Jiangsu, Liaoning, Jilin, Heilongjiang, Hunan, Ningxia), and 60-100 per cent of the third pregnancies were aborted in 13 provinces (Beijing, Shanghai, Tianjin, Liaoning, Jilin, Heilongjiang, Jiangsu, Zhejiang, Anhui, Shangdong, Hubei, Hunan, Sichuan). Broadly speaking, East China provinces had the highest abortion proportions while those in West China had the lowest and those in Central China were in the middle.

Table 5.6 presents the means and standard deviations for the abortion proportions, and for all other variables included in the analysis. The 15 development variables represent economic performance, health, education, women's status, urbanization, and the development status of the rural population. Five variables reflect the economic development and economic structure: *per capita* GDP represents the overall economic

development level, which has an average value of 5287 yuan with a rather high standard deviation; Proportion of industrial output is the percentage of industrial output out of the total value of the gross product of a province, averaging 78 per cent; per establishment industrial productivity is the 1995 value of industrial output (in yuan) divided by the number of industrial establishments in the area in 1995 and has an average value of 1840 yuan with a very high standard deviation; industrial diversification refers to the number of industrial activities in an area and the distribution of the work force among those activities, which is computed from the population by industrial categories and has the average value of 0.5; percentage of employed women in non-agricultural industries reflect women's economic status, which averaged 39 per cent in 1995.

The next five development variables pertain to the development status of the rural population in 1995: per capita expenses for food, for clothing, for housing, for family equipment and services, and for entertainment. As China is predominantly rural, variables representing rural development are particularly meaningful in that the overall population picture is largely dominated by the rural component. These five variables had average values of 802 yuan, 101 yuan, 197 yuan, 76 yuan and 109 yuan in 1995.

The last five development variables capture the social dimensions of development including urbanization, health and education. Urbanization level is measured as the percentage of the province's total population living in the urban area (municipalities and towns), which has the average of 35 per cent. The two health condition indicators are the ratio of hospital beds per 100 thousand population and the ratio of doctors per 100 thousand population, whose average values are 271 and 414 respectively. Education variables are represented by the ratio of books per 100 thousand population (average value of 25) and the ratio of persons having junior high school education or over per 10 thousand population (mean value of 3982).

Table 5.6 Descriptive statistics of the variables included in the analysis

	N	Minimum	Maximum	Mean	Std. Deviation
Total fertility rate	29	0.85	2.39	1.66	0.40
per cent abortion at 1st pregnancy	29	2.36	23.08	8.82	5.76
per cent abortion at 2nd pregnancy	29	10.61	81.82	41.29	18.37
per cent abortion at 3rd pregnancy	29	10.00	100.00	51.74	22.70
Per capita GDP	29	1740.91	17403.32	5287.48	3275.01
per cent industrial output	29	64.79	97.54	77.95	8.14
Per establishment industrial productivity	29	342.64	12388.82	1840.09	2430.24
Industrial diversification	29	0.25	0.86	0.51	0.16
per cent employed women in non-agricultural industries	29	34.75	45.11	39.17	2.68
Per capita expenses for food	29	471.54	1491.40	801.84	244.39
Per capita expenses for clothing	29	45.50	252.31	100.87	49.32
Per capita expenses for housing	29	77.62	761.06	196.63	136.61
Per capita expenses for family equipment and services	29	30.90	284.37	76.28	55.02
Per capita expenses for entertainment	29	33.74	256.04	109.47	58.49
per cent urban	29	16.39	83.75	35.46	16.97
Number of hospital beds per 100 thousand population	29	156.78	511.59	270.94	95.46
Number of doctors per 100 thousand population	29	248.00	927.26	414.24	169.46
Number of books per 100 thousand population	29	11.74	80.55	25.25	11.84
Number of persons with junior high school education per 10 thousand population	29	2185.90	6530.10	3982.68	1009.83
Early marriage rate	29	0.00	9.88	1.68	2.58
Birth planning rate	29	60.42	99.56	88.48	10.27
per cent currently using contraceptives	29	80.77	93.60	90.21	3.20
Multiple birth rate	29	0.00	30.65	9.53	7.97
Ratio of total taxation to income tax	29	2.50	12.00	6.09	2.28

Source: 1997 NDRHS data, *China Statistical Yearbook* 1996, and *China Population Yearbook* 1996.

The family planning variables capture the various dimensions of the family planning policy. Early marriage rate is measured as the percentage of the marriages below the legal minimum age among the total marriages. The minimum age for marriage is 20 for women and 23 for men in China, and marriages before these ages are illegal. The early marriage rate is on average 1.7 per cent. Family planning rate (or birth planning rate) measures the proportion of 1995 births that were 'legitimate' from the standpoint of Chinese family planning requirements regarding the number and timing of the births which differed across the provinces. This proportion has the average value of 88 per cent. Contraceptive prevalence is the proportion of the married couples who were using any contraceptive method in 1995, the average value of 90 per cent is among the world's highest (the contraceptive prevalence rate from family planning statistics in the State Family Planning Commission is slightly higher than the figure reported in the 1997 survey). The last family planning variable is multiple birth rate. Multiple births are those whose order of birth are higher than the highest parity stipulated in the family planning policy, which are usually the births at parity three or over. On average nearly 10 per cent of 1995 births were 'illegitimate'.

The one variable indicating the political capacity of the local governments is measured as the ratio of total taxation to income tax for the township and village enterprises in 1995. As many studies of Chinese fertility pointed to the important role of government in implementing the family planning policy, the intention in including such a variable is to capture, to some extent, the capacity and effectiveness of local governments in exerting political and social control over the society and people's behaviour, including the implementation of the family planning policy. The variable is calculated as the total taxation the local government had extracted from the enterprises divided by the income tax the enterprises should pay to the government. On average the total taxation was six times the income tax, with a very small standard deviation of 2.3.

Table 5.7 presents the results from the factor analysis. The 20 variables are analysed using Pearson correlation coefficients, and this correlation matrix is factor analysed using the principal component method, extracting three factors that are named Factor 1, Factor 2 and Factor 3 in the Table. The mostly commonly used criterion for determining the number of the factors to be extracted is the eigenvalue of each factor to be equal to or larger than 1. Extracted factors are then rotated by the Varimax method (Varimax with Kaiser Normalization). The sorted, rotated factor loadings are shown in

the first three columns of Table 5.7. Each variable is assigned to the factor with which it has the highest correlation (hence the highest loading); the variables that form each factor are highlighted. The factor loadings reflect the relative effect of the factors on the variables. The communality of a variable (h^2), as shown in the last column of Table 5.7, measures the extent to which the variance of the dependent variable is explained by the factors (proportion of the variance of the dependent variable explained by the independent variables in a regression model). For example, the three factors in the Table explain 96 per cent of the variance in *per capita* GDP, and Factor 1 alone explains 65 per cent of the variance (0.807*0.807). The bottom section of Table 7 gives the eigenvalue of and the variance explained by each factor. The accumulated proportions show that the three extracted factors explain 81 per cent of the total variance in the data of the 20 variables.

Factor 1 has the eigenvalue of 6.8 and explains 34 per cent of the total variance. It has the highest loading on *per capita* expenses for food, *per capita* expenses for family equipment and services, *per capita* expenses for housing, *per capita* expenses for entertainment, *per capita* GDP, number of books per 100 thousand population, per establishment industrial productivity, and percentage of women employed in non-agricultural industries. Thus Factor 1 may be regarded as representing the economic development component of the society in each of the provinces.

Factor 2, which has the eigenvalue of 6.0, explains 30 per cent of the total variance and has the highest loading on number of hospital beds per 100 thousand population, number of doctors per 100 thousand population, percentage urban, number of persons with junior high school education per 10 thousand population, industrial diversification, *per capita* expenses for clothing, and percentage of industrial output. Factor 2 may be interpreted as representing the social development component of the society in each of the provinces.

Table 5.7 Factor loadings for variables included in sorted, rotated factor matrix, and communality values

Variables	Factor 1	Factor 2	Factor 3	h^2
Per capita expenses for food	0.914	0.171	0.177	0.895
Per capita expenses for family equipment and services	0.902	0.314	0.125	0.927
Per capita expenses for housing	0.900	0.168	0.217	0.886
Per capita expenses for entertainment	0.853	0.216	0.164	0.801
Per capita GDP	0.807	0.533	0.157	0.960
Number of books per 100 thousand population	0.780	0.281	0.000	0.695
Per establishment industrial productivity	0.710	0.569	0.128	0.844
per cent women employed in non-agricultural industries	0.617	0.408	0.103	0.558
Number of hospital beds per 100 thousand population	0.180	0.944	0.000	0.923
Number of doctors per 100 thousand population	0.300	0.911	0.000	0.924
per cent urban	0.446	0.842	0.000	0.908
Number of persons with junior high school education per 10 thousand population	0.356	0.830	0.200	0.855
Industrial diversification	0.488	0.688	0.148	0.734
Per capita expenses for clothing	0.606	0.672	0.293	0.905
per cent industrial output	0.481	0.637	0.261	0.705
Multiple birth rate	-0.271	-0.125	-0.879	0.862
Early marriage rate	-0.209	0.000	-0.788	0.664
Birth planning rate	0.000	0.395	0.746	0.715
per cent currently using contraceptives	0.259	-0.277	0.711	0.649
Ratio of total taxation to income tax	0.130	-0.481	-0.687	0.721
Eigenvalue	6.820	5.985	3.327	
Variance explained	34.098	29.924	16.636	
Accumulated variance explained	34.098	64.022	80.658	

Calculated using SPSS 11.0.
Source: Table 5.6.

Factor 3 is highly loaded on the remaining family planning and governance variables: multiple birth rate, early marriage rate, birth planning rate, percentage currently using contraceptives, and ratio of total taxation to income tax. It has the eigenvalue of 3.3 and explains 17 per cent of the total variance. The four family planning variables reflect, to a large extent, the effectiveness of the local government in implementing the family planning policy which deals with fertility control specifically through marriage, contraception and number and timing of births. So Factor 3 may represent the family planning component of the society in each of the provinces.

Except for the tax variable which also has a fairly high loading (nearly -0.5) from Factor 2, the family planning variables are not correlated with other factors, while some of the social and economic variables, mainly *per capita* GDP, per establishment industrial productivity, Industrial diversification, *per capita* expenses for clothing, and percentage of industrial output, are also fairly strongly correlated with other factors (factor loading between 0.5 and 0.6). This may suggest that while the economic and social components are, to some extent, intercorrelated, the family planning component has an independent role in influencing fertility and abortion in China. This has been mentioned widely in the past studies of Chinese fertility, and the factor analysis here has provided the empirical evidence for the independent workings of China's family planning program at the provincial level.

By identifying the three components of China's social and economic development and family planning program, which are represented by the three latent factors, it will be possible to examine statistically the effect of the three components on the incidence of abortion by parity. It is hypothesized that both the socio-economic development and family planning policy have independent important effects on abortion rates, but the influence is parity-specific given the nature of China's family planning policy; that is, at parity one, family planning policy does not have a significant effect on the abortion rate, but at parity two or over, family planning policy has a significant and increasingly important role in determining the abortion rate.

Multiple linear regression is used to examine the associations between the three factors and parity-specific abortion rates. Regression estimated factor scores corresponding to each case of the sample are the independent variables, and the abortion percentages of

total pregnancies at each parity are the dependent variables in the three regression models. Table 5.8 reports the results from the three regression models.

Table 5.8 Regression results for pregnancy-specific abortion rate, 1995, China

Independent variables	B	Beta	P	R^2
First pregnancy			**	0.367
Factor 1	3.260	0.566	***	
Factor 2	1.075	0.187		
Factor 3	-0.620	-0.108		
Constant	8.821		***	
Second pregnancy			***	0.459
Factor 1	6.909	0.376	**	
Factor 2	7.809	0.425	**	
Factor 3	6.804	0.370	**	
Constant	41.288		***	
Third+ pregnancy			***	0.707
Factor 1	9.190	0.405	***	
Factor 2	8.722	0.384	***	
Factor 3	14.279	0.629	***	
Constant	51.737		***	

Note: B=coefficient, Beta=standardized coefficient. Calculated using SPSS 11.0.
*p<0.05, **p<0.01, ***p<0.001.
Source: Tables 5.6 and 5.7.

The upper panel of Table 5.8 shows the results for the effect of the three factors on the abortion rate at parity one. The model is significant at 0.01, and 37 per cent of the variance of the dependent variable is explained by the three factors. Only Factor 1 has a significant effect on the incidence of abortion at parity one; Factor 2 and 3 do not have any significant effect. It is intuitive that even though China has the one-child policy, the choice of the outcome of the first pregnancy is not regulated by the family planning policy: pure personal choice dominates this process. Economic development broadly determined the abortions occurring at the first parity.

Results from the middle and lower panels of Table 5.8 have supported the hypothesis on the increasingly significant role of the family planning program in the occurrence of abortions at parity two and three-plus. The model in the middle panel is significant at 0.001, and 46 per cent of the variance of the dependent variable is explained by the three factors. All the three factors have significant and similarly great effects on the abortion rate at parity two. The role of social development is slightly bigger as indicated by the standardized Beta coefficient. The third model in the lower panel

seems to have the best fit, which is significant at 0.001 and explain 71 per cent of the variance of the dependent variable. While all the three factors have significant effect, the family planning factor has a much higher coefficient than the other two factors. So the family planning program has the most important role in determining the abortion rate at the third-plus parity. According to China's family planning policy, a third or higher-order birth is not permitted in any situation except for some minority-nationality populations, consequently abortions of the third-plus pregnancies are largely policy dominated.

The above regression analysis reveals an interesting and important pattern in the relative importance of the three factors representing economic and social development and family planning program. At parity one, economic and social development are much more important than the family planning program in determining the incidence of abortion; at parity two, economic and social development and family planning have rather similar importance in determining the incidence of abortion; while at parity three plus, the family planning program has a much more important role in determining the incidence of abortion.

5.5 Concluding Remarks

Factors affecting induced abortion represent one of the most complex and intriguing areas in studies of human behaviour. Despite the fact that induced abortion is one of the major proximate determinants of fertility, there is a wide range of factors, both intermediate and more remote, determining the abortion incidence. When a woman acknowledges that a pregnancy is undesirable, there are still many steps towards obtaining an abortion. Both the desirability of a pregnancy and the recourse to an abortion are the combined result of the forces and factors at societal, local and individual level.

Despite the long dispute over the political, religious, and moral issues surrounding induced abortion in the Western world, China is among the rare cases where only health consequences were the concern of the initial abortion liberalization. Throughout history, no stigma has been attached to the practice of abortion. Cultural tolerance, implementation of the family planning programs and rapid socio-economic changes

largely shape the abortion patterns, while local and individual characteristics also play independent roles resisting or adapting to the broader framework of societal changes.

Data available suggest that there are marked similarities in abortion patterns between China and the rest of the world. Women of higher socio-economic status are more likely to have abortions as they have greater competing reasons to terminate a pregnancy than to carry the pregnancy to term. Despite China's unique and stringent family planning policy, socio-economic differentials in abortion incidence are substantial, and spatial diversity is the best-established feature of the abortion patterns observed over the temporal and cross-sectional variations.

The intercorrelated complexity of the wide range of variables is teased out with their relative independence and strength through multivariate analyses. The observed effects of the socio-economic variables on incidence of abortion are well maintained when addressed in the multivariate context with statistical controls. Urbanized, higher-educated women and women of Han majority nationality are invariably more likely than others to abort a pregnancy and have repeated abortions. Rural women in more developed communities are also doing so. When time period, age and number of pregnancies are controlled for, region (policy strength) and place of residence has the largest effect on abortion incidence. Urban women and women in East China provinces are several times more likely than their counterparts to experience a higher number of abortions. Women's past reproductive experience, particularly the number of children they already have, has the second largest effect on incidence of (repeated) abortions; this could be a heightened effect by the one-child policy. Education, particularly secondary education, also has a dramatic influence on women's abortion experience. All the significantly independent effects of these variables are in conformity with those proposed in the hypothesis.

When women's background characteristics controlled for, women's knowledge and attitudes towards induced abortion also have significant and independent effects on their abortion experience. Among the hypothesized knowledge and attitudinal variables, contraceptive failure experience and the awareness of the health consequences of induced abortions are the most influential, followed by the attitudes towards premarital sex and postpartum contraception, and finally the attitude towards family planning services for the unmarried. These results have important policy

implications, suggesting that more family planning program efforts are needed to address the unmet needs for effective contraceptive methods and to ensure their widespread use, and to provide better reproductive health education and services.

At the provincial level, both social and economic development and family planning strength have significant independent effects on abortion rates. However, the family planning effects are apparently parity-specific while economic development influences abortion incidence at all levels of parity. The relative strength of these forces is that economic and social developments play a dominant role in abortions at lower parities, and family planning implementation is dominant at higher parities. No effect from family planning is observed on abortion at first parity. The implication is that with declining fertility, the role of family planning policy will be increasingly replaced by socio-economic development.

Reducing abortions is by all means desired at both the individual and societal level. When fertility is constrained, the only solution is to raise contraceptive use and to improve contraceptive effectiveness. Despite the world's highest contraceptive prevalence rate in China and heavy reliance on sterilization and IUDs, contraceptive failure is widespread. Women who have experience of contraceptive failure are more than twice as likely to have abortions net of the effect of other variables. The other side of the coin is to reduce the unauthorized pregnancies. Persuaded or coercive abortions are unavoidable when there are numberous pregnancies that do not meet the family planning policy. However, higher abortion risk is in fact associated with higher socio-economic status and is unlikely to be the result of more prevalent pregnancies that are unauthorized. With the socio-economic transitions and declining fertility, as well as the quality-care approach to family planning policy, the diversity of abortion behaviour tends to increase while the overall abortion rate falls.

Chapter 6

Sex Preference and Induced Abortion in China

6.1 Introduction

While the fertility transition in China over the last three decades has been among the most rapid and remarkable in the world, a similarly dramatic demographic trend has been the rising sex ratio at birth (SRB) in China since the early 1980s when China introduced the one-child family planning policy. The substantial worldwide scholarly attention to the rising SRB and the related 'missing girls' problem in China has been on the magnitude, patterns, determinants and implications of this trend (Banister 1987; Hull 1990; Gao 1995; Zeng et al. 1993; Gu and Roy 1996). There are three major potential explanations from these studies: underreporting of female births, female infanticide and abandonment, and prenatal sex identification followed by sex-specific abortion (Hull 1990; Johansson and Nygren 1991; Zeng et al. 1993; Tu 1993; Coale and Banister 1994;). However, studies disagree on the relative importance of the three factors contributing to the high SRB in China. Earlier studies attribute it primarily to underreporting and excess mortality of female children, while recently some Chinese scholars (Xie 1998; Chu 2001; Qi and Chu 2002) have done local studies claiming prenatal sex-selective induced abortion to be the major and increasingly important factor for the rising SRB in the last decade.

It is often argued that China's stringent family planning policy is directly related to the rising SRB, and female underreporting, female infanticide and sex-selective abortion have all resulted from the implementation of the family planning policy (Hull 1990). However, these explanations, proximate as they are, fail to tell us what event or phenomenon has caused China to have an abnormally high SRB (Poston 2001b). A combination of three factors has necessarily led to the rising SRB in China (as well as in Taiwan and South Korea): demographically, the dramatic fertility reduction in which couples are no longer able to have the number of children they desire; culturally, the strong and pervasive son preference despite the desire for a smaller family size; and technologically, the development and availability of modern techniques for prenatal sex identification and subsequent sex-selective abortions (Peng and Huang 1999; Poston 2001b; Qi and Chu 2002). Any single factor, such as son preference, will not

automatically result in abnormal SRB; however, son preference is at the centre of the whole issue.

Sex-selective processes showing son preference involved in childbearing have been widely noted in many of the studies on Chinese fertility and SRB (Arnold and Liu 1986; Tu 1993; Gu and Roy 1996; Hao and Gao 1997; Chen 2002; Qiao 2002). As demonstrated in these studies, in China, incidence of abortion, childbearing and SRB are heavily influenced by the number and sex of the previous children a woman has. Socio-economic differentials in abortion and childbearing are also partly interwoven with the effects of son preference. However, the question remains unclear as to what extent son preference has affected induced abortion, which in turn largely determines the sex ratio at birth in China. The purpose of this chapter is to address this question. In this chapter, the relation between son preference and induced abortion is examined in a multivariate context. To help comprehend indirectly the magnitude of sex-selective abortion, the sex ratio at birth in China is investigated empirically with respect to its trends, dynamics and patterns. After that, life table and survival analyses are used to address the effect of son preference on fertility and induced abortion when controlling for women's background characteristics. Finally the effect of son preference on fertility and abortion is estimated through an index developed to capture such effect.

6.2 Sex Ratio at Birth: Trends and Patterns

While purely biological SRB can hardly be determined, observed SRB is a combined result of a wide range of factors. SRB, or what is the called secondary sex ratio, is directly determined by the primary sex ratio plus the sex difference in mortality of the fertilized eggs, embryos and foetuses. SRB may be influenced by any factor affecting the primary sex ratio including sex-selective fertilization, racial difference, women's age and pregnancy order and those affecting the sex difference in mortality of the fertilized eggs, embryos and foetuses including spontaneous abortion and sex-selective abortion (Tu 1993; Waldron 1998). The reported SRB may also be affected by sex-selective infanticide and sex-specific underreporting of births.

International and historical variations in SRB suggest that they are determined by a range of factors including ethnic differences, foetal mortality rates, fertility rates and social processes (Waldron 1998). Ethnic differences in SRB are typically observed with

the populations of negroid origin, where SRBs are generally lower as evidenced by both the cross-country patterns in sub-Saharan Africa and racial difference within countries (Visaria 1967, cited in United Nations 1973; Teitelbaum 1972; Waldron 1998). Visaria (1967, cited in United Nations 1973) argued that the slightly lower SRB for negroid populations may have a genetic basis. The most recent data on SRB both across the world (Figure 6.1) and within the United States (Figure 6.2) show consistently lower SRBs for black populations.

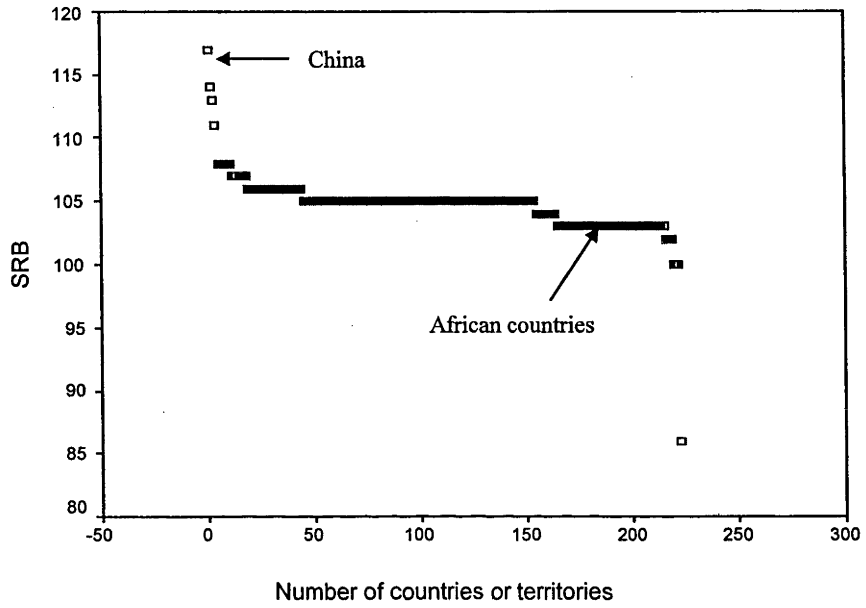
Studies also suggest that oriental SRBs tend to be higher than white SRBs which are higher than those of blacks (James 1987a: 723; James 1987b: 875; Clarke 2000: 44). Using data from before the 1980s, researchers find that SRBs in Korea, Japan and to Chinese parents in the U.S. are consistently higher, and it may be suspected that SRB variation across the three main races is partly caused by variation in maternal gonadotropin levels (James 1987b: 876).

Historical declines in fertility and foetal mortality rates probably contributed to the rising SRBs that were documented over certain periods in some developed countries. Decreased foetal mortality (particularly for males) resulting from improved nutrition and maternal health also contributes to higher SRBs. In many developed countries, reductions in perinatal mortality and advances in medical care during pregnancy have particularly favoured male babies, accounting for the increase, though small, in SRBs in the 20th century (Clarke 2000). Declining fertility resulting in fewer higher order births and a larger proportion of low-order births tends to elevate SRBs, as low-order births have higher SRBs. In many populations, SRB tends to decrease with birth order (United Nations 1973). Teitelbaum (1972) reviewed a list of 29 factors associated with SRB, suggesting that birth order seemed to be the most important factor affecting SRB as SRB diminished irregularly from the first birth to the second and so on.

However, the greatly elevated SRB in China (as well as in Taiwan and South Korea) over the last two decades has gone well beyond the forces of these historical changes even if they could have served to raise it. The very high sex ratios at higher-order births in China reported in the recent censuses are in striking contrast to the lower sex ratios observed for similar births in most populations. Since normal SRBs are found typically to lie between 103 and 107 males per 100 females (Chahnazarian 1988; Waldron 1998), an SRB that substantially deviates from this normal range implies deliberate

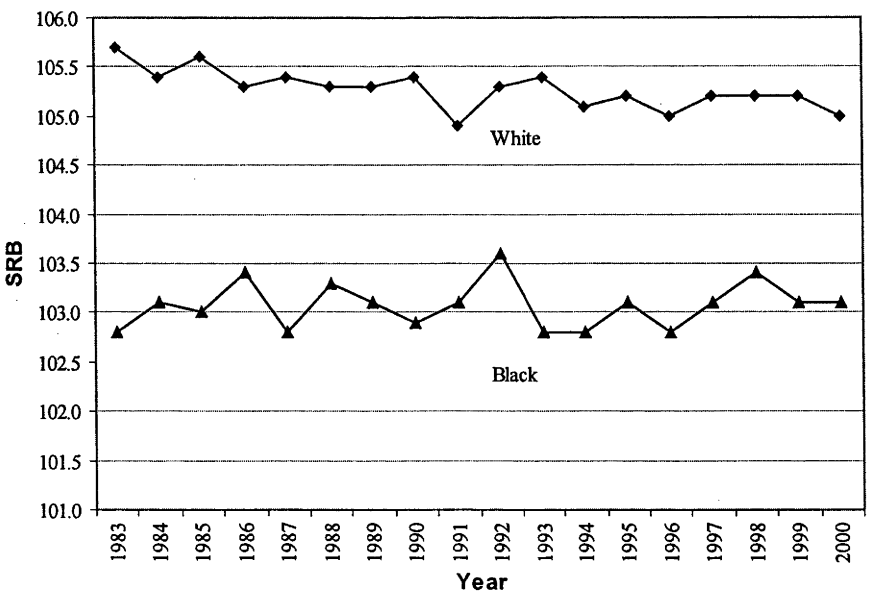
interventions to the roughly equal probability of a male and a female birth. Sex-selective abortion, under-reporting of female births and female infanticide are the social processes that are considered to account for the abnormally high SRB in China despite considerable controversy over their relative importance.

Figure 6.1 Sex ratio at birth for countries or territories of the world, 2000



Source: SRB for China is the 2000 census figure, SRBs for all other countries or territories are from *World Fact Book 2000*. http://education.yahoo.com/reference/factbook/invert/sex_ratio.html. Date accessed: 4 May 2003.

Figure 6.2 Sex ratio at birth for the White and Black populations of the United States, 1983-2000



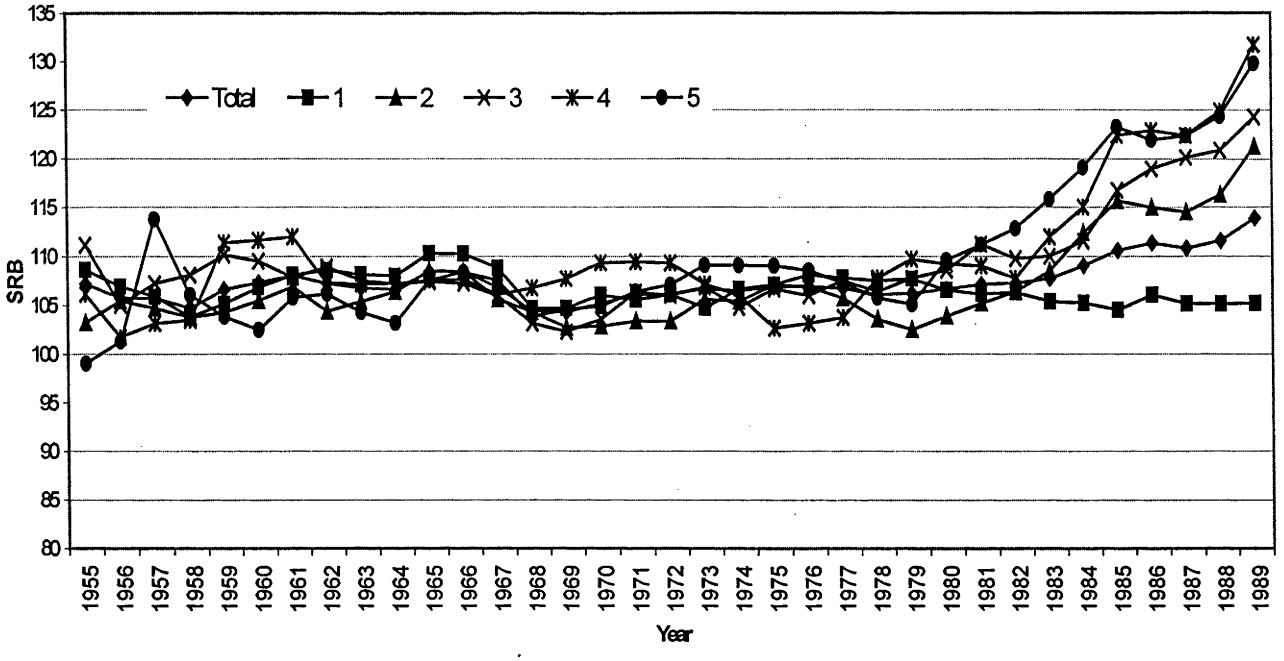
Source: US National Center for Health Statistics, *National Vital Statistics Reports,* vol. 50, no. 5, Feb. 12, 2002. http://www.infoplease.com/ipa/A0005083.html. Date accessed: 4 May 2003.

6.2.1 Levels and Trends

The trends and dynamics of SRB in China have been well documented and examined by a number of studies based on China's large fertility surveys and population censuses. High SRB is not new to the most recent two decades in China. During the 1930s and 1940s, SRB in China was higher than normal as a result of excess female mortality associated with female infanticide. The large reduction in this practice and the improved status of women in the Communist period contributed to the retaining of an SRB by and large within the normal range from the 1950s to the early 1980s. It should be noted that the normal SRBs over these periods stood at around the upper limit of the normal range. A 'stopping rule' (selective termination of childbearing following a male birth), and some traditional methods regarding both pre-pregnancy selection changing the sex ratio at conception and prenatal sex selection favouring males, may have contributed to the relatively high SRB within the normal range (Coale and Banister 1994; Jia and Peng 1995). However, from the mid-1980s, SRB in China began to deviate from the normal level increasingly and substantially in the circumstances of declining family size and availability of modern techniques for sex identification. By 2000, China had an SRB of 116.9, the highest figure among the countries of the world. Consequences associated with this severely biased sex ratio are likely to be of global importance when it is taken into account that China's population is 22 per cent of the world total.

Figure 6.3 plots the trends of China's SRBs over 1955-1989. Data for 1955-1988 come from the 1988 Two-Per-Thousand Fertility Survey; SRBs are the three-year moving averages, in order to reduce large fluctuations due to the very small numbers of cases in the early years. The 1989 SRB is from the 1990 census data. The figure shows that the overall SRB was fairly normal before the early 1980s, and parity-specific SRBs were following a similar pattern. As soon as the one-child policy was initiated in the late 1970s, SRB at parity 3-5+ began to deviate from the normal range, and SRB at parity 2 also started the upward trend in 1984, thus pushing up the total SRB to be abnormally high in 1985. Since then, China's SRBs have risen continously. Throughout the entire period, SRB at first birth remains normal. However, there seemed to be an initial rise in the SRB at first birth occurring in the 1990s, from 105.2 in 1990 (1990 census data) to 106.4 in 1995 (1995 one per cent sample survey data) and 107.1 in 2000 (2000 census data).

Figure 6.3 Sex ratio at birth by parity, China, 1955-1989



Source: Data for 1955-1988 come from the 1988 fertility survey; the 1989 figure is the 1990 census data.

In order to examine the relationship between SRB and birth order and to test whether higher-parity SRBs are statistically significantly different from lower-parity SRBs, two linear regressions are run for SRBs separately for 1955-1979 and 1980-1989. Four dummy variables are created for parity-specific SRB X_i (i =2, 3, 4, 5), year represented by X_1 is also entered into the models:

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5,$$

where Y is the SRB. The regression results are presented in Table 6.1. Results of Model 1 show that all SRBs but that at parity 2 are not significantly different from SRB at parity 1. The signs of the regression coefficients demonstrate that SRBs at parity 2 or over are lower than SRB at parity 1, some indication of converging with the pattern previously observed in developed countries. However, the year coefficient is positive, indicating a slightly rising trend in SRBs. Model 2, however, displays a totally different picture of the dynamics of SRB over 1980-1989. All the variables are statistically significant at 0.001, and higher-parity SRBs are increasingly higher than the lower-parity SRB. SRBs at parity 2, 3, 4 and 5 are respectively 6.4, 9.7, 12.2 and 13.5 points higher than SRB at parity 1. The year coefficient indicates that across all parities, SRB gains 1.6 points with an additional year.

Table 6.1 Regression coefficients testing the difference in parity-specific SRBs, China, 1955-1979 (Model 1), 1980-1989 (Model 2) and 1990-1999 (Model 3)

Variables	Model 1	Model 2	Model 3
Year	0.004	1.621***	1.837***
SRB at parity 2	-2.015**	6.354***	40.307***
SRB at parity 3	-0.226	9.666***	44.475***
SRB at parity 4	-0.036	12.180***	
SRB at parity 5+	-1.041	13.475***	
Model significance	*	***	***
R-square	10.3	82.4	90.9

*P<0.05, **P<0.01, ***P<0.001. Calculated using SPSS 11.0.

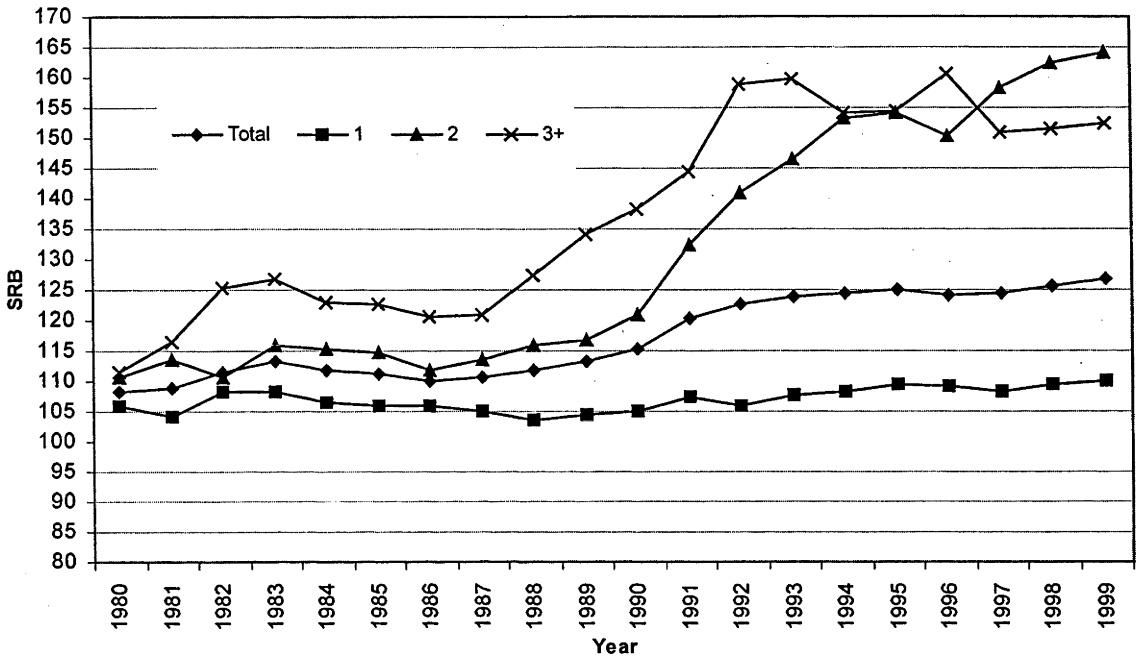
Source: 1988 and 2001 fertility survey computer record data file.

In the 1990s China had a further dramatic fertility decline, TFR dropping to well below the replacement level. At the same time, the increasing SRB in China has also been intensified. Two fertility surveys in the late 1990s and early 2000s have documented these trends. However, SRBs generated from these two surveys are much higher than the census figures while fertility rates are largely similar. These two surveys, unlike the fertility surveys in the 1980s, have much smaller sample size as their main focus is switched to reproductive health. There can be huge differences in SRB depending on the sample size. The sampling method, multistage cluster sampling, may also introduce bias for SRB, and underreporting of female births is also likely to have an effect on SRB from the surveys. Nevertheless, the surveys still provide useful insights into the trends and dynamics of SRB in the 1990s. Figure 6.4 presents SRBs from the 2001 fertility survey (sample size nearly 40 thousand versus 15 thousand in the 1997 survey), spreading back into the past to 1980. Again, moving averages are calculated for SRBs, but on a 5-year basis, as fluctuations are enormous, as can still be seen in Figure 6.4.

While levels in SRBs are much higher than what we have previously reported, trends are similar. As births at parity 3 or higher are very few, only three groups of SRBs are calculated: SRB at parity 1, 2 and 3 plus. In the 1990s there was a further dramatic increase in SRB at parity 2 and 3 plus. As shown in Model 3 of Table 6.1, in the 1990s, SRBs at parity 2 and 3 plus are significantly much higher than SRB at parity 1: on average, 40.3 and 44.5 points, respectively. SRBs were on average pushed up by 1.8 points with every additional year. Comparing the results with those from Model 2, the upward trends which occurred in the 1990s are striking. The three models in Table 6.1 clearly show the highly differentiated processes and dynamics of SRB changes over the

three periods: before 1980, the 1980s and the 1990s. Not coincidentally, these three periods are seen to have intensifying trends in fertility decline largely driven by the implementation of the family planning policy.

Figure 6.4 Sex ratio at birth by parity, China, 1980-1999



Source: Computer record data file of the 2001 fertility survey.

Looking at SRBs geographically across China (Table 6.2), increase in SRB occurred in most provinces between 1990 and 2000: total SRB increased in 26 provinces, and city, town and county SRB increased in 21, 21 and 26 provinces, respectively. Provinces in south-central China gained the largest increments, with Hainan, Guangdong, Hubei, Hunan and Anhui being particularly pronounced with an increment of 15-20 points; while provinces in both east and west China incurred moderate increments. Table 6.3 shows that across the provinces, SRB on average increased by 5.5 points and the difference between the two censuses is statistically highly significant. This is largely dominated by the change in SRB at the county level, which had an increment of 6.2 points that is statistically highly significant. The gain in city SRB over the two censuses, which is moderate at 3.3 points, is also statistically significant, while the increment of 4.1 points in town SRB is statistically insignificant. It is clear from this, and the fact that city, town and county populations in 2000 are proportionately 23.4 per cent, 13.2 per cent and 63.4 per cent, that China's further precipitously elevated SRB is mainly a result of the dynamics of county and city SRB.

Table 6.2 Sex ratio at birth by place of residence, 31 provinces of China, 1990 and 2000

Provinces	Total			Cities			Towns			Counties		
	1990	2000	Δ	1990	2000	Δ	1990	2000	Δ	1990	2000	Δ
Beijing	106.2	110.6	4.4	105.7	113.0	7.3	102.2	109.6	7.4	107.5	104.9	-2.6
Tianjin	110.7	112.5	1.9	106.6	106.4	-0.2	103.3	112.0	8.6	116.1	120.2	4.1
Hebei	112.3	113.4	1.1	106.1	109.6	3.5	113.4	112.9	-0.5	113.0	114.3	1.3
Shanxi	109.7	112.5	2.9	110.2	108.9	-1.3	111.6	114.6	3.0	109.5	113.1	3.7
Inner Mongulia	107.4	108.5	1.1	104.0	106.3	2.3	104.0	106.2	2.2	109.0	110.1	1.1
Liaoning	110.1	112.8	2.7	106.1	110.3	4.2	109.0	114.9	5.9	113.1	114.2	1.2
Jilin	108.1	111.2	3.1	105.1	110.8	5.7	106.9	111.1	4.2	109.4	111.6	2.1
Heilongjiang	107.4	109.7	2.3	105.9	109.9	4.0	106.8	109.4	2.6	108.5	109.7	1.2
Shanghai	104.4	110.6	6.3	104.6	110.5	5.9	101.5	111.6	10.1	104.3	110.3	6.0
Jiangsu	114.5	116.5	2.0	112.8	111.8	-0.9	108.4	116.9	8.5	115.2	118.5	3.3
Zhejiang	117.8	113.9	-4.0	106.0	110.9	4.9	120.7	115.7	-5.0	119.8	114.6	-5.2
Anhui	110.5	127.9	17.4	109.5	113.3	3.9	109.5	125.0	15.5	110.7	130.9	20.2
Fujian	110.5	117.9	7.4	111.1	113.8	2.7	121.0	117.1	-3.9	109.6	119.5	9.9
Jiangxi	110.6	114.7	4.2	111.2	113.0	1.9	113.6	107.4	-6.2	110.3	116.4	6.1
Shandong	116.0	112.2	-3.8	114.2	109.0	-5.2	117.8	111.2	-6.5	116.2	113.6	-2.6
Henan	116.6	118.5	1.8	114.3	112.9	-1.5	116.1	122.4	6.3	116.9	119.0	2.1
Hubei	109.5	128.2	18.7	108.7	120.9	12.3	113.8	125.6	11.8	109.4	132.4	23.0
Hunan	110.5	126.2	15.7	106.4	115.9	9.5	110.7	122.2	11.5	110.9	129.0	18.0
Guangdong	111.8	130.3	18.5	114.0	124.5	10.4	121.0	133.4	12.4	109.8	132.8	23.1
Guangxi	117.7	125.6	7.8	113.5	117.2	3.6	111.0	127.4	16.4	118.4	126.5	8.1
Hainan	115.6	135.6	20.0	107.8	140.5	32.7	135.4	139.5	4.1	114.7	132.8	18.1
Chongqing	-	115.1	-	-	107.3	-	-	110.3	-	-	118.1	-
Sichuan	111.5	116.0	4.5	108.9	109.7	0.9	104.7	110.3	5.6	112.2	118.2	6.0
Guizhou	101.8	107.0	5.3	98.8	105.6	6.8	107.8	112.0	4.3	101.9	106.6	4.7
Yunnan	106.8	108.7	1.9	105.5	104.3	-1.2	105.4	104.7	-0.7	107.0	109.7	2.7
Tibet	103.1	102.7	-0.3	106.9	102.9	-4.0	105.2	103.8	-1.3	102.6	102.6	0.0
Shaanxi	111.1	122.1	11.0	115.1	115.3	0.2	114.3	114.0	-0.3	110.5	125.6	15.1
Gansu	110.3	114.8	4.5	107.4	111.4	4.0	115.1	120.9	5.8	110.6	114.8	4.2
Qinghai	104.6	110.4	5.7	112.4	105.7	-6.7	92.8	106.2	13.3	104.4	111.9	7.5
Ningxia	110.0	108.8	-1.3	108.8	105.1	-3.8	113.0	104.8	-8.2	110.0	110.1	0.1
Xinjiang	103.7	106.1	2.4	106.0	107.1	1.1	104.1	105.1	1.0	103.3	106.0	2.8
Total	111.1	116.9	5.7	109.0	112.8	3.9	112.2	116.5	4.3	111.8	118.1	6.3

Note: Δ is the absolute increment of sex ratio at birth from 1990 to 2000.

Sources: The 1990 data come from Office of Population Census under the State Council, 1991, *10 per cent Tabulations of China 1990 Population Census Data*, China Statistics Press. The 2000 data are from Population Division of National Bureau of Statistics of China, 05/09/2002, S/5454.

Table 6.3 Difference in average SRB by place of residence across the provinces

Place of residence	Average SRB		Difference
	1990	2000	
City	108.45	111.73	3.29*
Town	110.67	114.78	4.11
County	110.48	116.70	6.22***
Total	110.02	115.52	5.49***

*P<0.05, **P<0.01, ***P<0.001; the figures represent the unweighted provincial average, not the national values.

Source: Table 6.2.

One of the notable trends over the last two censuses was the marked increase in SRB in China's largest cities. In 1990, Shanghai and Beijing had SRBs of 104.35 and 106.21 respectively, but these values increased to 110.64 and 110.56 in 2000. Looking at SRB by place of residence within the two municipalities, while Shanghai held a relatively constant SRB (around 110) between city, town and county, Beijing surprisingly had a decreasing pattern of SRB from highly abnormal (112.98) in city and moderately high (109.59) in town to normal (104.89) in county. Across the provinces of China, most cities had normal SRBs in 1990, but only nine provinces in 2000 had normal SRBs in their cities. As China had a migrant population of 138 million in 2000, one may wonder if the abnormally high SRB in urban areas is mainly a result of the high SRB of the migrant population in the urban areas. Table 6.4 compares the SRB between migrant and non-migrant populations across place of residence. Overall, SRB was higher for non-migrants than for migrants in 2000, and surprisingly this is the case in cities. The statistical test shows that the difference in SRB between the migrant and non-migrant populations is highly insignificant across place of residence. The SRB difference for non-migrants between city, town and county is smaller than for the migrants. From this pattern we can infer that the high SRB in urban areas is not the responsibility of the migrants from the rural areas.

Table 6.4 Sex ratio at birth by migration status

Migration status	Male births	Female births	Sex ratio at birth
City			
Non-migrants	728	621	117.23
Migrants	536	466	115.02
Town			
Non-migrants	689	562	122.60
Migrants	196	152	128.95
County			
Non-migrants	3869	3214	120.38
Migrants	377	342	110.23
Total			
Non-migrants	5286	4397	120.22
Migrants	1109	960	115.52

Source: Computer record data file of one per-thousand subsample of the 2000 Census.

This new development of rising SRB in the cities, which is rather unexpected, needs to be carefully examined and analysed, as some of the previous studies argued that the patterns found in Chinese cities implied that the rising SRB in China was not necessarily the outcome of the one-child policy. In Shanghai and Beijing where the

one-child policy was most effectively carried out, there was a normal SRB, reflecting a weak cultural setting of son preference.

However, the development of a market economy with tremendous risks and uncertainties in a transitional society could reinforce parental reliance on and hence preference for male children. Some studies (Zhu 1998; Zhang Weiguo 2000) show that Chinese peasants choose strategies of early marriage and early childbearing to resist the risks associated with the market-oriented reform. Marriages occur more frequently within the same village (usually a village has a dominant clan) in order to expand and strengthen the power and influence of their patriarchal clan, which makes the bearing of male children more desirable. The same could also apply to the cities, especially when urban growth is increasingly fuelled by rural migrants. In addition, some elements of sex inequality, particularly with regard to employment of college graduates and laying-off workers in the context of rising unemployment and competition, were increasing rather than decreasing in the cities despite an overall pronounced improvement in the social and economic status of females. According to the 2000 survey on women's status by the All-China Women's Federation, 75 per cent of the urban women interviewed state that women are not treated equally with men (calculated by author from the computer record file of the survey data). Interviews with the researchers in the All-China Women Federation suggest that in the 1990s, while China experienced radical and tremendous changes, notions regarding social gender actually became more conservative, and some critical aspects measuring sex inequalities, particularly the social and economic participation of females versus males, had deteriorated (Interview 2003a). In a time of uncertainties and insecurities, sex preference could be strengthened, particularly in the Chinese society where preference for sons has existed and developed for 2000 years.

Another possible reason for the rising SRB in the cities is also associated with the market-oriented reform. Despite the fact that urban residents have fuller and better access to medical facilities and have very low fertility, urban SRB was normal in the 1980s. This phenomenon is in marked contrast to that observed in South Korea and India where urban areas were earlier than rural areas to experience rising SRB with declining fertility. Although less strong son preference and little importance of sons for old-age support could have underlain the normal SRB in urban China, an important aspect would be the more effective government control over urban citizens, which in

fact was one of the reasons why urban fertility was declining much more rapidly than rural fertility in China. Until recently urban residents in China have been under extensive and intense control, and monitored by the government through both the household registrations and work units where the urban workers get wages, housing, medical services and also welfare for their children. However, this has been radically changed by the market-oriented economic reform. According to the employment data in China (*China Statistical Yearbook* 2002: 120), urban employment in the non-public sector was only 0.8 per cent in 1980 and 18 per cent in 1990; however, this percentage rapidly increased to 58 per cent in 2000. People working in the non-public sector are largely out of the control of the government; however, they have much higher incomes than those employed in the state or collective-owned units. The government has no longer been able to exert as effective influence and control over them through administrative measures as it did previously. This may lead to more illegal practices of foetal sex identification and sex-selective abortions, at least in the non-public sector in urban China.

6.2.2 Patterns and Covariates

Son preference is largely associated with cultural traditions which are rather robust to socio-economic development. Son preference may be observed as inherent in the cultural settings of many countries, but particularly those influenced by Confucianism with China and Korea being the typical examples. On the other hand, low-fertility countries such as Thailand and Sri Lanka that are influenced by Hinayana Buddhism do not exhibit bias towards boys (Kua and Ruffolo 1995).

Factors of two broad types at different levels are affecting sex preference in various countries. At the societal level, modernization, cultural settings, socio-economic and political transformation, and population policy and fertility decline are likely to have an effect on sex preference; while at the individual level, socio-economic characteristics of parents directly influence their preference for the sex of children. Shryock and Siegel (1971) pointed out that changes and differentials of SRB should be interpreted cautiously, since SRB can be affected by the demographic characteristics of the child and the parents and the socio-economic status of the parents. Among the more than 30 factors summarized by Teitelbaum (1972) and James (1987a), the demographic characteristics of the child and the parents, including family size, age of the parents,

age difference of the parents and birth order of the child, and socio-economic status of the parents, including social class and social status, parental occupation and urbanity, usually have a more significant effect on SRB than other environmental, social and behavioural factors. For example, Moore (1958, cited in United Nations 1973) found a negative association between SRB and the age of mother during 1901-54 in England and Wales; Manning et al. (1997) suggest that a large difference in age between the parents tends to predict the sex of the first child; and a number of studies confirm that parents of upper social classes are more likely to have higher SRB than the parents of lower social classes, and SRB correlates to some slight extent with parental occupation (James 1987a). Interestingly, a recent British study of how diet affects the health of new mothers and their babies produced a surprising finding that vegetarian women are more likely to have girls. In the vegetarian women in the study, there were 81.5 boys born for every 100 girls (The Practicing Midwives, August 2000).

While historical data on SRB are not available in China to test the various demographic and sociological hypotheses, in this section, patterns and differentials of SRB in China are examined by the various demographic and socio-economic characteristics of the women drawn from a subsample of the 2000 population census data. The National Bureau of Statistics of China has provided Chinese scholars working on the analysis of the census data with one-per-thousand subsample data of the 2000 census. The empirical analysis in this section is based on these sub-sample census data. It should be noted that the subsample has produced an SRB of 119.38 compared to 116.86 from the total population data.

Characteristics of the women (percentage distribution) from this subsample are presented in the first column of Table 6.5. The second column is the percentage distribution of births to the women in the year preceding the census. These two distributions are rather similar across the socio-economic variables (but not the demographic variables including age, birth order and sex composition of previous children). The next two columns are the number of male and female births, according to which SRB is calculated and listed in the last column.

Table 6.5 Socio-demographic and economic differentials in sex ratio at birth, China, 2000

Characteristics	Women	Births	Male births	Female births	Sex ratio at birth
Age					
15-24	24.15	37.39	2308	2086	110.64
25-29	14.59	42.50	2711	2284	118.70
30-34	16.30	16.25	1115	795	140.25
35-50	44.96	3.85	261	192	135.94
Place of residence					
City	26.13	20.01	1264	1087	116.28
Town	14.10	13.61	885	714	123.95
County	59.77	66.39	4246	3556	119.40
Nationality					
Han	91.57	87.11	5599	4638	120.72
Minority	8.43	12.89	796	719	110.71
Education					
Illiterate	7.46	5.22	309	305	101.31
Primary	32.70	29.37	1917	1535	124.89
Junior middle	40.72	48.33	3088	2592	119.14
Senior middle	14.72	12.14	768	659	116.54
College+	4.40	4.93	313	266	117.67
Occupation					
Cadres and technicians	5.99	6.57	406	366	110.93
Service personnel	9.99	6.95	453	364	124.45
Agricultural workers	50.94	56.31	3644	2973	122.57
Industrial workers	9.87	6.19	383	345	111.01
Unknown	23.21	23.98	1509	1309	115.28
Region					
North	12.43	11.67	713	659	108.19
Northeast	9.14	6.35	395	351	112.54
East	29.67	26.72	1739	1401	124.13
Southcentral	27.36	27.94	1891	1392	135.85
Southwest	14.24	18.84	1144	1070	106.92
Northwest	7.16	8.48	513	484	105.99
Birth order					
1	3.16	68.73	4149	3928	105.63
2	1.20	26.08	1865	1197	155.81
3+	0.24	5.19	381	232	164.22
Sex composition					
No children	8.32	68.75	4149	3928	105.63
Only sons	33.10	9.33	564	532	106.02
Only daughters	23.55	19.17	1502	750	200.27
Sons>daughters	5.98	0.31	13	24	54.17
Sons=daughters	21.04	1.91	124	100	124.00
Sons<daughters	8.01	0.54	43	20	215.00
Total	100.00	100.00	6395	5357	119.38

Note: Distribution of women by birth order is summed to be 4.60 per cent, the remaining majority 95.40 per cent did not have childbearing in the year preceding the census.
Source: Computer record data file of one per-thousand sub-sample of the 2000 Census.

A general observation is that very high SRBs are associated with women aged over 30, living in towns, belonging to the Han majority nationality, having primary education and being engaged in service or agricultural work. South-central and east China have much higher SRBs than elsewhere. Children's demographic characteristics have the most dramatic effect on SRB. Most severely biased SRBs occurred to births at parity 2 or over and following only or more daughters as the previous children. The most advanced socio-economic groups, including women living in cities and having the highest education and women cadres and technicians, also have abnormally high SRBs. Fairly normal SRBs occurred only to a limited number of subgroups, including women without any education, living in west China, having first child and continuing childbearing when previous children were all boys.

As the observed bivariate relationships may be distorted by effects from other variables, it is necessary to conduct multivariate analysis to examine to what extent the observed patterns are maintained when other variables are controlled, that is, to look at the effect of one variable net of the effects of other variables. The proper method of multivariate analysis of sex ratio at birth is logistic regression when the underlying dependent variable is binary: coded 1 if there is a male birth and 0 if a female birth. The basic equation of the logistic regression is:

$$\ln\left(\frac{p}{1-p}\right) = b_0 + b_1X_1 + b_2X_2 \ldots b_nX_n$$

where the dependent variable, sex ratio at birth, is specified in terms of the odds of a male birth, $\frac{p}{1-p}$; the variables X_i (i=1, 2, ..., n) on the right-hand side of the equation represent a range of independent variables. All the independent variables are categorical, hence are specified as dummy variables. As elaborated in Retherford and Roy (2003: 21) and Retherford and Choe (1993: 142-147), unlike OLS regression in which substitution of mean values for the independent variables always yields the mean value of the dependent variable, this is generally not the case for logistic regression. In order for the logistic regression to produce the adjusted value of total SRB that is identical to the observed value of total SRB, the constant term in the fitted regression equation needs to be first adjusted by subtracting the sum product of the fitted coefficients and the mean values of the independent variables from the natural log

value of the observed total SRB. This yields a new constant term value which is then substituted for the original one (b_0) in the fitted equation. When calculating the adjusted SRBs for all categories of the independent variables from the model, multiple classification analysis (MCA) tables are set up. When calculating the value of $\ln\left(\frac{p}{1-p}\right)$ from the fitted regression for each category of a particular independent variable, dummy values of that variable are set to be combinations of ones and zeros while all other variables are controlled by holding them constant at their mean values. Finally exponentiation of the values of $\ln\left(\frac{p}{1-p}\right)$ yields the adjusted values of SRB. Table 6.6 presents the results of the adjusted SRBs.

SRBs calculated from the bivariate models are identical to the observed SRBs, while SRBs generated from the multivariate analyses (Models 1 to 3) are the adjusted SRBs with statistical controls. However, the measurement and interpretation of SRBs should be taken with caution, as SRBs are sensitive to sampling methods and sample sizes. The sample involved in this analysis is only 11752 births; the range of SRB variations can be fairly wide simply because of chance or sampling errors. To distinguish statistically significantly (at 5 per cent level) between an SRB of 105 and an SRB of 110, the sample size must be at least 14000 births. While the values of SRB in Table 6.6 cannot be inferred statistically to the general population, it is useful to consider the patterns and the directions of the effects of the variables.

The bivariate relationships show that across the socio-economic variables, few categories have a significantly different SRB from the SRB of the reference group despite the fact that some observed SRBs are much higher than the reference SRB. This is the case even in Model 1 in a multivariate context. The adjusted SRBs in the second column do not differ much from the observed SRBs in the first column. Across the variables, only the highest SRB at age 30-34 and in south-central China is significantly different from the respective reference group in both the bivariate and multivariate models. Therefore it can be partly explained that abnormally high SRB has spread to a much wider range of population groups, causing a virtual universality in the population of China of highly biased SRBs that differ little from each other.

Table 6.6 Adjusted sex ratio at birth by socio-demographic and economic variables based on logistic regressions, China, 2000

Independent variables	Bivariate	Multivariate		
		Model 1	Model 2	Model 3
Age				
15-24 (ref)	110.64	111.18	125.02	125.76
25-29	118.70***	118.69	118.12	118.06
30-34	140.25*	138.04***	112.88	110.44*
35-50	135.94	137.50*	108.57	113.07
Place of residence				
City (ref)	116.28	118.51	122.94	123.26
Town	123.95	127.06	128.12	127.64
County	119.40	118.12	116.62	116.62
Nationality				
Han	120.72*	119.91	120.37	120.01
Minority (ref)	110.71	115.84	112.85	115.16
Education				
Illiterate (ref)	101.31	105.52	95.92	98.79
Primary	124.89*	123.55	117.59*	117.84*
Junior middle	119.14	117.90	119.10*	118.61*
Senior middle	116.54	120.67	129.57**	129.34*
College+	117.67	121.95	137.71**	137.83*
Occupation				
Cadres and technicians (ref)	110.93	107.89	109.41	109.97
Service personnel	124.45	120.20	121.34	121.38
Agricultural workers	122.57	124.16	122.80	122.46
Industrial workers	111.01	106.78	110.33	110.77
Unknown	115.28	114.96	116.20	116.68
Region				
North	108.19	108.48	107.42	106.75
Northeast	112.54	115.13	118.38	116.16
East	124.13*	123.81	127.67**	124.50*
Southcentral	135.85***	134.01**	133.38**	135.11***
Southwest	106.92	107.58	104.17	106.76
Northwest (ref)	105.99	107.40	105.61	106.12
Birth order				
1 (ref)	105.63		102.11	
2	155.81***		164.21***	
3+	164.22***		190.23***	
Sex composition				
No children (ref)	105.63			101.99
Only sons	106.02			112.50
Only daughters	200.27***			211.37***
Sons>daughters	54.17*			61.67
Sons=daughters	124.00			136.20*
Sons<daughters	215.00**			243.90**

*P<0.05, **P<0.01, ***P<0.001; ref=reference group.

Source: Computer record data file of one-per-thousand subsample of the 2000 Census.

The two demographic variables (at the bottom of the first column), however, have a strong influence on the SRB. SRB at parity 2 or over and SRB at childbearing following female-dominated previous children are significantly much higher. These SRBs become even higher when other socio-economic variables are controlled (Models 2 and 3). It is argued that sex imbalance of births has occurred mainly to women who already have one or more children who are all or mostly daughters (Gu and Roy 1996), and this pattern of SRB is held across virtually the whole range of socio-economic groups of the population (Tu 1993). A study in China's Anhui province also demonstrated that the risk of having a second or third child increased over time for couples who had all daughters (Graham et al. 1998).

Some interesting and important patterns emerged from Models 2 and 3, which have not been previously noted. Regarding age, place of residence and education, the direction of their effects on SRB is almost entirely different from that observed in the bivariate relationships. When other socio-economic and demographic variables are controlled, age is negatively related to SRB, that is, the younger the women, the higher their SRB; city SRB is much higher than county SRB; and education is positively correlated with SRB, that is, the more educated the women, the higher their SRB, and the positive effect of education is statistically significant. As young, urban and highly educated women are more likely to have low fertility, and they are also more likely to have better access to medical facilities and sex-selective techniques, sex-selective abortions are more likely to be responsible for their highly abnormal SRB than for those of women of other characteristics. Similar patterns are also observed in India (Retherford and Roy 2003) and Vietnam (Belanger et al. 2003) where higher socio-economic status is typically associated with higher SRB. Across all three models, patterns of SRB with respect to nationality, occupation and region are fairly consistent and only differ slightly.

Examination of the dynamics and patterns of SRB in this section suggests important associations between son preference and sex-selective childbearing. In the next section, the effect of son preference on childbearing and abortion is more fully explored using the fertility history data from the 1997 survey.

6.3 Sex Preference, Fertility and Induced Abortion: Survival Analysis

Many studies of Chinese fertility demonstrate the strong influence of son preference on fertility regulation. Even in high-fertility regimes, deliberate intervention in childbearing with regard to birth interval, parity progression and abortion through Chinese traditional medicine was widely practised in China before the introduction of the family planning program, largely reflecting the effect of son preference when people would rather achieve their childbearing goals through moderate fertility (Zhao 1997; Peng and Huang 1999). However, son preference has seemed to be much stronger and more visible in the context of the rapid fertility transition. Both local and national fertility surveys have consistently reported more evident practices of son preference since China established the family planning policy, in that couples who have all daughters are significantly more likely to continue childbearing and less likely to use contraception and abortion (Li and Cooney 1993; Qian 1997; Chen 2002; Poston 2002).

In this section, the effect of son preference on fertility and induced abortion is examined using Cox's (1972) partial-likelihood estimation procedure. The literature, as well as the discussion of patterns of SRB in the last section and in Chapter 4, suggests a strong association between the sex of the previous child or children and the subsequent reproductive behaviour. We can frame these notions in terms of hypotheses as follows: among the women with one birth, having one daughter will increase the probability of the women having a second birth and decrease the probability of aborting the second pregnancy; and among women with two births, having two daughters will increase the probability of the women having a third birth and decrease the probability of aborting the third pregnancy.

Table 6.7 presents women's contraceptive use by sex composition of the children at parity 1 and 2. When there is son preference, women who have all daughters or have not achieved the desired number of sons will have lower rates of both overall contraceptive use and sterilization. This is confirmed in the Table. At both parity 1 and 2, proportions of contraceptive use and sterilization is lower for women having daughters only, and particularly women with two daughters have a much lower percentage of sterilization. Women having a boy as the first child and a girl as the second seem to be most satisfied.

Table 6.7 Contraceptive use after the first live birth and the first two live births according to the sex composition of the prior children (%)

Sex composition	Not using	Sterilization	IUD	Pill	Condom	Cases
1 child						
Boy	9.92	2.79	77.36	3.65	6.27	2328
Girl	14.93	1.98	73.66	2.74	6.70	1822
Total	12.12	2.43	75.73	3.25	6.46	4150
2 children						
Boy, boy	10.19	75.42	13.02	0.68	0.68	883
Boy, girl	9.08	74.63	14.68	1.24	0.37	804
Girl, boy	7.44	77.50	13.82	0.71	0.53	1129
Girl, girl	11.64	63.90	22.33	1.43	0.71	421
Total	9.14	74.45	14.92	0.93	0.56	3237

Source: 1997 NDRHS computer record data file.

Table 6.8 shows the women's reproductive behaviour after the first live birth and the first two live births. Compared to women having sons or both sons and daughters, those who have daughters only are significantly more likely to have another pregnancy, and their pregnancies are more likely to be carried to term and less likely to be aborted. Eighty per cent of the women with a daughter (versus 75 per cent of the women with a son) became pregnant, and 25 per cent (versus 30 per cent) were aborted. The differences are much more marked in giving birth again and obtaining abortion between the women who have different sex combinations of the previous two children. Over 60 per cent (74.2*82.4) of the daughters-only women had a third birth, nearly double the rate of other categories, while the abortion rate of the third pregnancy is only half as much.

Table 6.8 Fertility event after the first live birth and the first two live births according to the sex composition of the prior children (%)

Sex composition	Subsequent fertility event			Cases
	Conception[a]	Live-birth[b]	Induced abortion[b]	
1 child				
Boy	75.46	66.09	30.16	5554
Girl	79.62	70.90	25.04	5378
Total	77.51	68.52	27.57	10932
2 children				
Boy, boy	47.71	69.27	28.04	1398
Boy, girl	51.60	73.87	21.89	1372
Girl, boy	44.18	72.10	24.64	1736
Girl, girl	74.15	82.37	12.86	1300
Total	53.50	75.08	21.09	5806

Note: [a] proportions among the total cases; [b] proportions among the total pregnancies.

Source: 1997 NDRHS computer record data file.

Table 6.9 is the distribution of the women with different composition of previous children according to the number of abortions they obtained. Once again, a systematic pattern is observed across the categories: women with daughters only are more likely not to obtain abortion and less likely to have repeated abortions.

Table 6.9 Sex composition of prior children and the subsequent number of abortions (%)

Sex composition	Number of abortions				Cases
	0	1	2	3+	
1 child					
Boy	67.28	21.84	7.74	3.13	5554
Girl	70.04	21.20	6.56	2.19	5378
Total	68.64	21.52	7.16	2.67	10932
2 children					
Boy, boy	80.97	14.02	3.65	1.36	1398
Boy, girl	81.41	13.41	3.50	1.68	1372
Girl, boy	82.85	12.43	3.40	1.32	1736
Girl, girl	84.54	11.77	2.77	0.92	1300
Total	82.36	12.97	3.34	1.33	5806

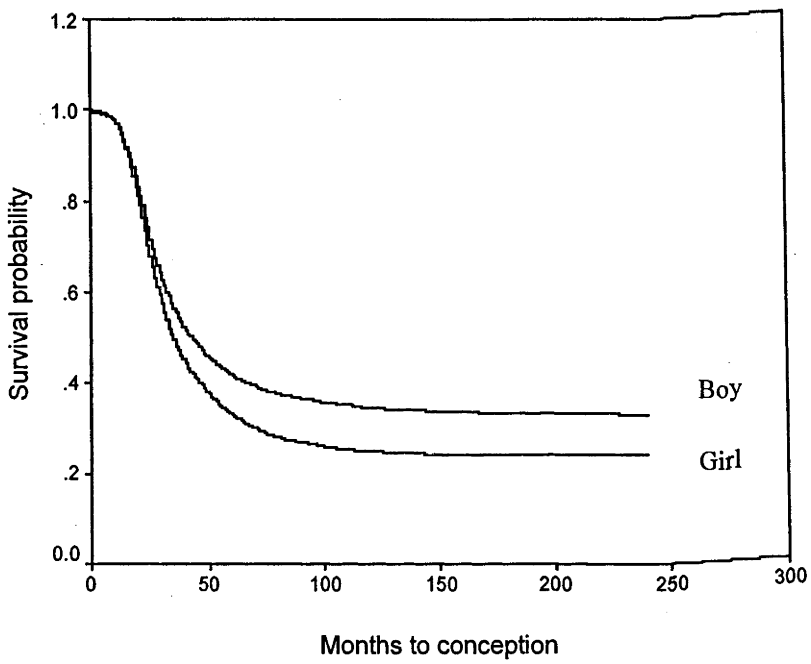
Source: 1997 NDRHS computer record data file.

Son preference affects not only the probability but also the timing of subsequent pregnancies and abortions. Figures 6.5 to 6.8 show the life table survival curve of experiencing subsequent births and abortions for women in these categories. From the first to second parity, women with a daughter, as compared to those with a son, more rapidly experience the transition to second birth and less rapidly experience the transition to abortion of the second pregnancy. The probability of surviving having the second birth by the 100th month is about 10 per cent lower for women with a daughter than for those with a son, and this magnitude of difference is maintained thereafter (Figure 6.5). Similarly the probability of surviving having an abortion of the second pregnancy by the 100^{th} month is about 10 per cent higher for women with a daughter than for those with a son, and the two curves level off with this magnitude of difference (Figure 6.7).

Patterns of differences in probability and timing are more dramatic and marked across the two-child groups (Figure 6.6 and 6.8). Women having all daughters are substantially more likely to have a third child more rapidly than the women with two sons, while the difference is very small between the two-son women and the one-son-one-daughter women. At the 50th month, the probability of surviving having a third birth at the third pregnancy is 30 per cent lower, and of having an abortion 30 per cent higher, for the women with two daughters than for those with two sons; and this difference is slightly increasing in the rest of the risk period. Interestingly, differences

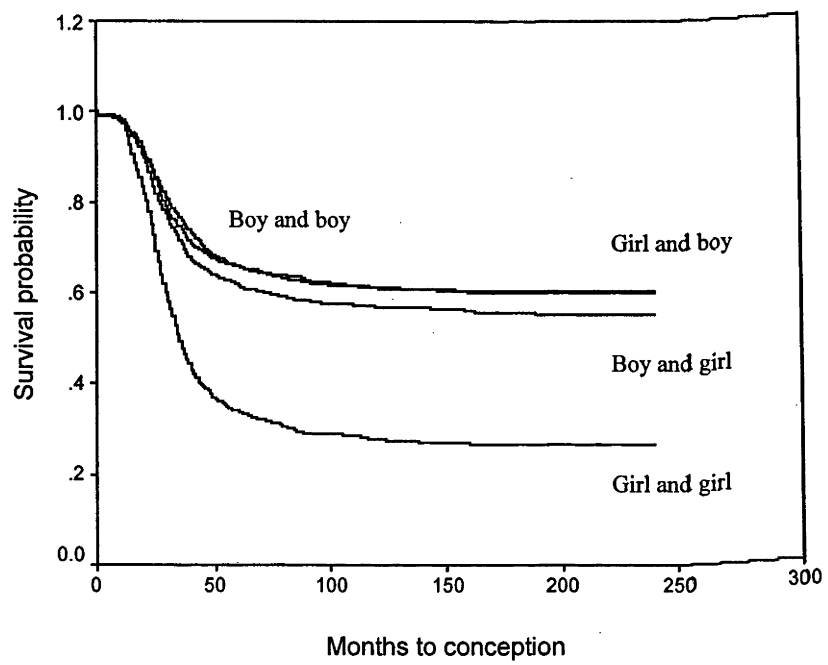
in the probability and timing of obtaining abortion at the third pregnancy are fairly substantial when the balanced-sex-composition groups are compared to women with all sons, while this is not the case in having the third birth (Figure 6.6).

Figure 6.5 Probability of surviving the hazard of birth at the second pregnancy by sex of the first child



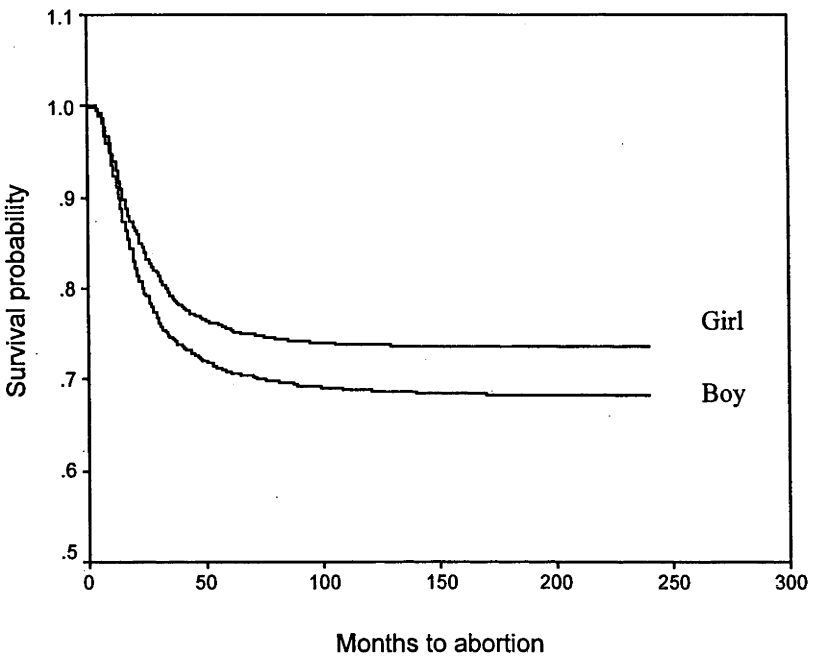
Source: 1997 NDRHS computer record data file.

Figure 6.6 Probability of surviving the hazard of birth at the third pregnancy by sex of the first two children



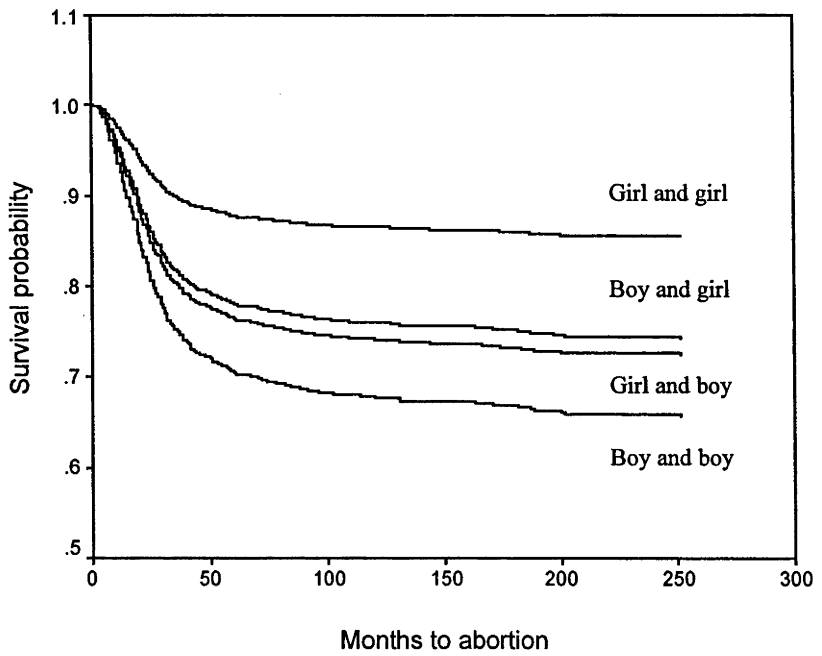
Source: 1997 NDRHS computer record data file.

Figure 6.7 Probability of surviving the hazard of abortion at the second pregnancy by sex of the first child



Source: 1997 NDRHS computer record data file.

Figure 6.8 Probability of surviving the hazard of abortion at the third pregnancy by sex of the first two children



Source: 1997 NDRHS computer record data file.

To what extent are these observed differences maintained when women's social and economic characteristics are controlled? In addressing this question, Cox's partial-likelihood method is applied to estimate continuous time proportional hazards models of the duration from the last birth to the next birth or abortion. This technique has been widely used in demographic studies of marriage, fertility, contraception, mortality, and migration (Trussell and Hammerslough 1983; Wu and Balakrishnan 1995; Hou et el. 1996; Guo 1999). The Cox model is an extension of the life table technique, allowing the relative likelihood and duration of the selected events to vary with a set of explanatory variables. The Cox model has the advantage of dealing with the problem of censoring, that is, the problem raised by those women who had not given birth or obtained abortion by the time of the survey but might yet do so in future (Hou et al. 1996).

The Cox proportional hazards model expresses the hazard function as the following:

$$\ln h(t) = \ln h_0(t) + \beta_1 X_1 + \beta_2 X_2 \ldots \beta_k X_k ,$$

where $h_0(t)$ is the hazard function of the underlying survival distribution for the reference group, which does not have to be specified; X_1 to X_k are the explanatory variables, and β_1 to β_k are hazard coefficients to be estimated. All the independent variables are time-independent, that is their values do not change over time, as is the situation in the analyses to be conducted in this section. Exponentiation of hazard coefficients β represents the effects of the independent variables on the hazard function relative to the reference group. Values greater or less than unity indicate a higher or lower probability of having a birth or an abortion compared to the reference category.

Four proportional hazard models (Tables 6.11 to 6.14) have been estimated, examining the effect of the main independent variable, sex of the previous child or children, on hazard of having another birth or an abortion when all other covariates are controlled. The survival-time data for each of the models consist of two variables: a dummy variable indicating for each woman whether or not the fertility event (a subsequent birth or abortion) occurred during the observed period; and an interval variable measuring the number of months between the date of the last birth and the date of conception leading to the next birth or terminated by abortion, or between the date of

the last birth and the date of the censoring event. For the birth models, the censoring events include the cases in which the woman is not married, a pregnancy ends in a miscarriage or a stillbirth or an abortion, the woman is currently pregnant, and the date of the survey (November 1997); and for the abortion models, the censoring events include all the above cases minus the abortions plus the pregnancies resulting in live-births.

The dependent variable in each of the models is an unobserved value representing the instantaneous probability of a woman having another birth or obtaining an abortion during the interval since the last birth. The main independent variables are a set of dummy variables indicating sex combinations of the previous child or children. There is a range of control variables, both at the individual and rural community level, entered in the models, and most of the variables are the same as the ones specified in the multivariate analyses in Chapter 5. Table 6.10 presents variable specifications, and mean and standard deviation of the variables. Dummy variables are created for all categorical variables, scored 1 for the dummy values and 0 otherwise. The only two interval variables are 'Age at first birth' and 'Age at second birth' specified in terms of women's age in years.

Tables 6.11 to 6.14 present the Cox proportional hazard model estimates of the effect of the presence of a daughter or two daughters, as well as other covariates, on the hazard of having another birth or an abortion. The hypotheses regarding the effect of daughters are perfectly confirmed: both 'Girl' and 'Girl, girl' variables have a positive hazard coefficient in the two birth models, while they have a negative hazard coefficient in the two abortion models, and they are all statistically significant at $P<0.001$. Daughter-only women have a significantly higher probability of having another birth, and more rapidly, than women who have sons or a combination of sons and daughters, while they are significantly delaying and have a lower probability of obtaining an abortion of the next pregnancy.

Exponentiation of the hazard coefficients gives the hazard ratios for the 'Girl' variable of 1.31 in the birth model and 0.80 in the abortion model. This means that among the sample of married Chinese women, having a daughter as the first child instead of a son significantly increases the hazard of having a second birth by 31 per cent, and decreases the hazard of obtaining abortion at the second pregnancy by 20 per cent. This indicates a very important and statistically significant effect of son preference on having the second child or aborting the second pregnancy.

Table 6.10 Variable specifications, and mean and standard deviation of the variables

Variables	All women		Rural women	
	Mean	S.D.	Mean	S.D.
Sex of the first child (Ref=Boy)				
Girl	0.49	0.50	0.49	0.50
Sex of the first two children (Ref=Boy and boy)				
Girl, girl	0.22	0.42	0.23	0.42
Girl, boy	0.30	0.46	0.30	0.46
Boy, girl	0.24	0.42	0.24	0.43
Age at first birth (in years)	23.14	2.83	22.67	2.62
Age at second birth (in years)	25.31	3.27	24.95	3.13
Place of residence (Ref=Rural)				
Urban	0.23	0.42		
Ethnic group (Ref=Minority)				
Han nationality	0.91	0.29	0.90	0.31
Education (Ref=Illiterate)				
Primary school	0.30	0.46	0.36	0.48
Junior middle school	0.32	0.47	0.31	0.46
Senior middle school	0.13	0.34	0.06	0.24
College or over	0.04	0.19	0.00	0.04
Period of first birth (Ref=Before 1980)				
1980-1989	0.34	0.47	0.34	0.47
1990-1997	0.25	0.43	0.25	0.43
Period of second birth (Ref=Before 1980)				
1980-1989	0.27	0.45	0.28	0.45
1990-1997	0.20	0.40	0.21	0.40
Region (Ref=West China)				
East China	0.39	0.49	0.35	0.48
Central China	0.50	0.50	0.54	0.50
Topography (Ref=Other)				
Plain			0.43	0.50
Source of drinking water (Ref=Other)				
Tap water			0.29	0.46
Electricity (Ref=No)				
Yes			0.97	0.16
Distance (Ref=40 kilometers or over)				
Below 20 kilometers			0.41	0.49
20-39 kilometers			0.35	0.48
Income (Ref=Below 1000 yuan)				
1000-1999 yuan			0.43	0.50
2000-2999 yuan			0.24	0.43
3000 yuan or over			0.10	0.30

Note: Ref=reference category.
Source: 1997 NDRHS computer record data file.

Table 6.11 Cox regression of the son preference effect on the hazard of having a second birth

Independent variables	All women			Rural women		
	HC	HR	SHR	HC	HR	SHR
Girl	0.27	1.31***	1.14	0.29	1.34***	1.15
Urban residence	-1.09	0.34***	0.63			
Han nationality	-0.01	0.99	1.00	0.05	1.05	1.01
Primary school	-0.06	0.94*	0.97	-0.08	0.92**	0.96
Junior middle school	-0.30	0.74***	0.87	-0.27	0.76***	0.88
Senior middle school	-0.59	0.55***	0.82	-0.19	0.83**	0.96
College or over	-1.65	0.19***	0.73	-0.52	0.59	0.98
1980-89	-0.31	0.73***	0.87	-0.23	0.79***	0.89
1990-97	-1.35	0.26***	0.56	-1.30	0.27***	0.57
East	-0.71	0.49***	0.71	-0.77	0.46***	0.69
Central	-0.13	0.88***	0.94	-0.15	0.86***	0.93
Age at first birth	-0.03	0.97***	0.93	-0.01	0.99*	0.97
Plain				-0.01	0.99	0.99
Tap water				-0.12	0.89***	0.95
Electricity				0.09	1.09	1.01
Below 20 kilometers				0.07	1.07*	1.03
20-39 kilometers				-0.01	0.99*	0.99
1000-1999 yuan				-0.08	0.92**	0.96
2000-2999 yuan				-0.06	0.94	0.97
3000 yuan or over				-0.12	0.89*	0.96
Model Chi-square		3731.90***			2000.73***	
Degree of freedom		12			19	
Number of cases		10818			8565	
Events		6700			6076	
Censored		4118			2489	

Note: HC=Hazard coefficient, HR=Hazard (odds) ratio. SHR=Semi-standardized hazard (odds) ratio. Calculated using STATA 7.0.
*p<0.05, **p<0.01, ***p<0.001.
Source: 1997 NDRHS computer record data file.

For the other control variables, the results largely confirm what has been found in the literature or what has been expected in both the direction and extent of their influence in having another birth or abortion. All the socio-economic variables have negative hazard coefficients and smaller-than-unity hazard ratios for the transition from the first to second birth, and have positive hazard coefficients and larger than unity hazard ratios for aborting the second pregnancy. Women in urban areas are nearly 70 per cent less likely than rural women to have a second child and have a probability that is 168 per cent greater of obtaining an abortion at the second pregnancy. While Han nationality women have a hazard of having a second child that is not statistically different from that for the minority-nationality women, their hazard of experiencing an abortion is 1.3 times that for the non-Han women.

Table 6.12 Cox regression of the son preference effect on the hazard of having a third birth

Independent variables	All women			Rural women		
	HC	HR	SHR	HC	HR	SHR
Girl, girl	0.91	2.48***	1.46	0.90	2.46***	1.46
Girl, boy	0.05	1.05	1.02	0.02	1.02	1.01
Boy, girl	0.13	1.14*	1.06	0.11	1.12	1.05
Urban residence	-0.48	0.62***	0.82			
Han nationality	-0.21	0.81***	0.94	-0.18	0.84**	0.95
Primary school	-0.19	0.83***	0.92	-0.16	0.85***	0.92
Junior middle school	-0.33	0.72***	0.86	-0.25	0.78***	0.89
Senior middle school	-0.45	0.64***	0.86	-0.40	0.67**	0.91
College or over	-0.58	0.56	0.90	1.14	3.13	1.05
1980-89	-0.47	0.63***	0.81	-0.48	0.62***	0.81
1990-97	-1.49	0.23***	0.55	-1.53	0.22***	0.54
East	-0.70	0.50***	0.71	-0.75	0.47***	0.70
Central	-0.18	0.84**	0.91	-0.22	0.80***	0.90
Age at second birth	-0.08	0.92***	0.77	-0.07	0.93***	0.81
Plain				0.02	1.02	1.01
Tap water				-0.11	0.90*	0.95
Electricity				0.10	1.11	1.02
Below 20 kilometers				-0.09	0.91	0.96
20-39 kilometers				-0.08	0.92	0.96
1000-1999 yuan				-0.05	0.95	0.98
2000-2999 yuan				-0.05	0.95	0.98
3000 yuan or over				-0.23	0.79**	0.93
Model Chi-square		1506.99***			1377.78***	
Degree of freedom		14			21	
Cases		5755			5274	
Events		2524			2381	
Censored		3231			2893	

Note: HC=Hazard coefficient, HR=Hazard (odds) ratio. SHR=Semi-standardized hazard (odds) ratio. Calculated using STATA 7.0.
*p<0.05, **p<0.01, ***p<0.001.
Source: 1997 NDRHS computer record data file.

Increases in education are negatively associated with the probability of experiencing the transition to a second child, and positively related to the likelihood of obtaining an abortion of the second pregnancy. For example, women with senior middle school education (12 years of schooling) are 45 per cent less likely and women with college or over education are more than 80 per cent less likely than the illiterate or semi-literate women to have a second child. Conversely, as expected, the hazard of experiencing an abortion of the second pregnancy for the higher education categories is nearly four times that for the reference group.

Family planning policy effects are particularly significant. If a woman had the first child after 1979 when China started the one-child policy, the hazard of transition to a second birth is much smaller while the hazard of experiencing an abortion is much greater. Possibly compounded with the development effect, as well as more rigid implementation of the family planning policy, the most recent period (1990-97) has considerably intensified trends in these associations. A woman is 74 per cent less likely to have a second birth and 4.7 times more likely to abort the next pregnancy than in the pre-one-child policy period. Regional (policy strength) effect is also expected in that women in East and Central China are less likely to have a second birth and more likely to obtain an abortion than those in West China. Women in provinces with greatest policy strength are 50 per cent less likely to have the second birth and 2.4 times more likely to terminate the second pregnancy through abortion.

Finally, women's age at first birth is found to be significantly and negatively associated with the transition to the second birth and positively related to the likelihood of having an abortion. For every additional year of age at the first birth, the hazard changes by 3-4 per cent in either direction.

Semi-standardized hazard ratios (Rabe-Hesketh and Everitt 2000: 155; Poston 2002: 342) suggest that the most influential covariates are those pertaining to policy period 1990-97, urban residence, East China and college education when women are experiencing the transition from the first to the second parity, and policy period 1990-97, middle school education, East China and urban residence when women are obtaining an abortion of the second pregnancy, despite the fact that the 'Girl' variable has a significant and strong influence on occurrence of the subsequent fertility events.

Such patterns of variations also largely hold for rural women, but both policy effects and son preference effects are stronger. In addition, some of the community characteristics also have had a significant effect on women's hazard of being more likely to terminate the second pregnancy than to carry it to term.

The patterns and associations analysed above occur systematically and consistently, and more markedly in most cases, when women have had two children and experience subsequent fertility events. The results from the Cox proportional hazard models for transition from the second to third parity are reported in Tables 6.12 and 6.14.

It is expected that if the first two children are both daughters, the mother will have a high positive probability of continuing to a third birth, and consequently the mother will have a high negative probability of aborting the third pregnancy. The effects of balanced sex compositions of the first two children on the hazard of transition to a third birth or obtaining an abortion should be considerably lower. The results closely follow expectations.

If women have two daughters, they will move to a third birth with a significant probability that is 2.5 times that for women with two sons, while their hazard of experiencing an abortion at the third pregnancy is significantly 60 per cent lower. This is the most impressive finding regarding the effect of son preference on fertility and abortion in these analyses. Balanced sex mix has much smaller hazard coefficients, nevertheless, their effects are not unappreciable. While their hazard coefficients for having a third birth are not statistically different from zero, they are significant in influencing the experience of abortion. It seems that if the woman had a first child a girl and the second a boy, she is more similar to a woman who has two boys in experiencing the subsequent fertility events. If the woman's first two children were first a boy and then a girl, the hazard of moving to a third birth is 14 per cent larger (significant at $P<0.05$) and the hazard of obtaining an abortion is 30 per cent less (significant at $P<0.001$) than that for the woman whose first two births are both boys. These results suggest a strong preference for one son, and to a lesser extent, for more than one son. Women are much more likely to stop, or to delay, their childbearing through abortion or other methods once they have the desired number of sons.

The effects of other covariates also confirm what is expected in most of the instances. Women in urban areas are only 60 per cent as likely to continue to a third birth and nearly three times more likely to obtain an abortion at the third pregnancy, compared to women living in rural areas. Han women have a hazard 20 per cent less than the non-Han women of moving to a third birth but the greater hazard of aborting the third pregnancy is not significant. Increasing education is significantly associated with decreasing probability of having a third birth, and with intensifying hazard of aborting the third pregnancy. The higher the woman's age at the second birth, the less likely she is to have a third birth, thus more likely to abort the third pregnancy.

Both the one-child policy implementation and the regional (policy strength) effects are highly significant. Compared to the period before 1980, women with two children in the most recent period are 77 per cent less likely to have a third birth and 3.1 times

more likely to abort the next pregnancy. Women in the provinces with greatest policy strength, compared to those in the weakest category, are 50 per cent less likely to have a third birth and 2.1 times more likely to abort if pregnant again when they have already had two children.

Semi-standardized hazard ratios clearly indicate the greatest relative importance of son preference in determining a woman's transition to a third birth. A similar magnitude of relative effect is observed for the policy period '1990-97'. However, in aborting the third pregnancy, policy period '1990-97' is the most influential factor, followed by urban residence, the secondary education and region. The two-daughters variable is rather less influential. A comparison between the two-child models with the one-child models shows that son preference effects appeared to be much stronger if women had two daughters without a son.

The above analyses suggest that increasing parity without the presence of a son is associated with aggravated pressure for a woman to have another birth which is a male; thus she is less likely to obtain an abortion when a pregnancy occurs, but this may entail extensive use of sex-selective abortions in the context of the current family planning policy. This is largely confirmed by the sudden big jump in SRB from the first to the second parity, continuing to rise in higher parities, documented in China's recent census and fertility surveys; it is also supported by the positive association between the number of abortions and rising SRB when the number of abortion rises from one to three as reported in Chapter 4.

It seems that rural community-level characteristics have had less important effects on the outcome of the third pregnancy than of the second pregnancy. The second birth is the policy boundary, and the few cases that have gone beyond the boundary may become subject to policy constraints rather than socio-economic development.

An interesting and important observation, exactly as seen in the earlier regression results, is that hazard ratios for education and nationality variables are larger for all women than for rural women, while the ratios assumed by sex of children, policy period and region (policy strength) are apparently higher in rural areas, suggesting again the important and fundamental urban-rural differences in the operating factors in reproductive behaviour.

Table 6.13 Cox regression of the son preference effect on the hazard of having an abortion at the second pregnancy

Independent variables	All women			Rural women		
	HC	HR	SHR	HC	HR	SHR
Girl	-0.22	0.80***	0.90	-0.38	0.68***	0.83
Urban residence	0.99	2.68***	1.52			
Han nationality	0.25	1.28**	1.07	-0.02	0.98	0.99
Primary school	0.65	1.92***	1.35	0.47	1.60***	1.25
Junior middle school	1.06	2.88***	1.64	0.75	2.11***	1.41
Senior middle school	1.34	3.80***	1.57	1.01	2.76***	1.27
College or over	1.33	3.78***	1.28	-7.64	0.00	0.72
1980-89	0.79	2.21***	1.46	1.08	2.94***	1.67
1990-97	1.56	4.74***	1.96	2.10	8.17***	2.49
East	0.88	2.41***	1.53	1.75	5.73***	2.30
Central	0.16	1.18	1.08	0.69	1.99***	1.41
Age at first birth	0.04	1.04***	1.11	0.01	1.01	1.01
Plain				-0.08	0.93	0.96
Tap water				0.29	1.33***	1.14
Electricity				0.26	1.30	1.04
Below 20 kilometers				0.07	1.07	1.03
20-39 kilometers				-0.16	0.85	0.93
1000-1999 yuan				0.12	1.12	1.06
2000-2999 yuan				0.27	1.31**	1.12
3000 yuan or over				0.60	1.81***	1.20
Model Chi-square		3434.37***			1530.90***	
Degree of freedom		12			19	
Cases		8140			6624	
Events		2334			1303	
Censored		5806			5321	

Note: HC=Hazard coefficient, HR=Hazard (odds) ratio. SHR=Semi-standardized hazard (odds) ratio. Calculated using STATA 7.0.
*p<0.05, **p<0.01, ***p<0.001.
Source: 1997 NDRHS computer record data file.

Table 6.14 Cox regression of the son preference effect on the hazard of having an abortion at the third pregnancy

Independent variables	All women			Rural women		
	HC	HR	SHR	HC	HR	SHR
Girl and girl	-0.954	0.39***	0.67	-0.98	0.38***	0.66
Girl and boy	-0.235	0.79**	0.90	-0.20	0.82	0.91
Boy and girl	-0.344	0.71***	0.86	-0.23	0.79	0.91
Urban residence	1.007	2.74***	1.53			
Han nationality	0.20	1.23	1.06	0.05	1.05	1.02
Primary school	0.64	1.89***	1.34	0.53	1.70***	1.29
Junior middle school	0.87	2.38***	1.50	0.71	2.04***	1.39
Senior middle school	1.07	2.91***	1.43	0.74	2.09***	1.19
College or over	0.80	2.23*	1.16	1.42	4.15	1.06
1980-89	0.33	1.39***	1.16	0.38	1.45***	1.18
1990-97	1.14	3.14***	1.58	1.21	3.36***	1.63
East	0.72	2.06***	1.42	1.14	3.13***	1.73
Central	-0.01	0.99	1.00	0.29	1.34	1.16
Age at second birth	0.07	1.07***	1.24	0.07	1.07***	1.23
Plain				-0.11	0.89	0.95
Tap water				0.20	1.22*	1.09
Electricity				0.78	2.17	1.13
Below 20 kilometers				0.28	1.32**	1.15
20-39 kilometers				0.06	1.06	1.03
1000-1999 yuan				-0.13	0.88	0.94
2000-2999 yuan				-0.23	0.80	0.91
3000 yuan or over				0.16	1.17	1.05
Model Chi-square		619.11***			378.14***	
Degree of freedom		14			21	
Cases		2987			2729	
Events		655			513	
Censored		2332			2216	

Note: HC=Hazard coefficient, HR=Hazard (odds) ratio. SHR=Semi-standardized hazard (odds) ratio. Calculated using STATA 7.0.
*p<0.05, **p<0.01, ***p<0.001.
Source: 1997 NDRHS computer record data file.

6.4 The Overall Effect of Sex Preference on Fertility and Abortion

This section assesses the overall effect of sex preference on recent fertility and abortion. In view of the strong son preference as discussed in the previous sections, to what extent has son preference affected fertility and abortion? Or stated in another way: if son preference disappeared, to what extent would China's fertility be reduced while abortion would be increased? Some of the fertility studies have attempted to measure and calculate such effects (Arnold 1985; Chowdhury and Bairagi 1990; Wen 1993; Chen 2002). However, as sex preference is a concept both economic and socio-cultural in nature, its effect can be widely felt and observed, but is very difficult to measure accurately. Nevertheless, the index—the sex preference effect on fertility (SFEF)—developed by Chowdhury and Bairagi (1990) is used in this section to assess the quantitative effect of sex preference on fertility.

Chowdhury and Bairagi (1990), borrowing the idea and method developed by Arnold (1985) for measuring the effect of sex preference on fertility according to the rate of contraceptive use by sex composition of women's previous children, suggest measuring the sex preference effect according to parity progression ratio by number and sex of living children. In their study of fertility in Bangladesh, 22819 married women of reproductive age (15-44 years) were followed for 3.5 years; the percentage of women giving birth during the follow-up period is the measure of fertility. The reasoning is that at each parity's sex composition, the lowest percentage giving birth is considered to be the fertility progression ratio in the absence of son preference, and this percentage is applied to other sex combinations at the same parity, thus calculating the expected percentage reduction in fertility at each parity and for all women. The index, which Chowdhury and Bairagi call the sex preference effect on fertility (SFEF) is calculated with the following formulas:

$$SPEF = (1 - \sum jFjWij / \sum jFijWij) \times 100$$ for women of parity i, and

$$SPEF = (1 - \sum i \sum jFjWij / \sum i \sum jFijWij) \times 100$$ for all women combined,

Where Fij is the percentage giving birth at parity i of women having j living sons ($j<=i$), Fj is the lowest value of Fij, Wij is the number of women at parity i having j living sons. 'The SPEF index describes the expected decline in fertility in the absence of a preference for children of a particular sex' (Chowdhury and Bairagi 1990: 752).

The SPEF index is applied to the 1997 survey data to assess the overall effect of sex preference on fertility and abortion. The percentage of women having at least one birth or one abortion in the five-year period preceding the survey was the measure of fertility and abortion. The percentages of women giving birth or having abortion are cross-classified by number and sex of the living children at the start of the five-year period, that is, 1992. This reconstruction of family size and composition was made possible by the nature of the fertility history data in the 1997 survey, which is approximately of a longitudinal study design. With the formulas specified above, the sex preference effect on fertility (SPEF) and the sex preference effect on abortion (SPEA) index are calculated for both initial parity level and overall level. The results are presented in Tables 6.15 and 6.16.

Table 6.15 Percentage of women giving birth in the 5-year period preceding the survey and values of index of sex preference effect on fertility, China, 1992-1997

Number of living children	Number of living sons	Number of women	Per cent giving birth	SPEF
0	0	2761	78.02	0.00
1				35.67
	0	1602	29.09	
	1	1880	13.19	
2				50.97
	0	476	11.97	
	1	2039	3.43	
	2	966	2.07	
3				34.50
	0	134	11.19	
	1	739	2.44	
	2	627	1.91	
	3	177	2.26	
4+				31.67
	0	44	4.55	
	1	264	1.14	
	2	332	1.51	
	3	189	1.06	
	4+	75	2.67	
Total		12305	25.01	11.40

Source: 1997 NDRHS computer record data file.

Twenty-five per cent of the women gave birth during the five-year period preceding the survey. There is an inverse relationship between the percentage giving birth and the number of living children. Across all parities, the larger the number of sons women have, the lower the percentage of women giving birth. Strong son preference is

observed in that the percentage giving birth is substantially higher among women with daughters only than among women with at least one son. The reversed trend at the highest number of living sons seems to be an indication of preference for sex balance. SPEF index values show that effect of sex preference on fertility is substantial. For example, second and third birth fertility could be reduced by 36 per cent and 51 per cent respectively among women having one and two children if they did not have son preference. The overall effect stands at 11.4 per cent, which is larger than an estimate (8 per cent) from a previous study assessing effect of sex preference on fertility using the 1988 fertility survey data.

Table 6.16 Percentage of women having abortion in the 5-year period preceding the survey and values of index of sex preference effect on abortion, China, 1992-1997

Number of living children	Number of living sons	Number of women	Percent having abortion	SPEA
0	0	2761	20.03	0.00
1				13.00
	0	1602	32.32	
	1	1880	43.09	
2				22.15
	0	476	15.79	
	1	2039	15.53	
	2	966	20.80	
3				17.21
	0	134	10.01	
	1	739	9.89	
	2	627	11.58	
	3	177	12.69	
4+				14.62
	0	44	9.09	
	1	264	7.58	
	2	332	9.58	
	3	189	9.94	
	4+	75	10.64	
Total		12305	22.25	12.68

Source: 1997 NDRHS computer record data file.

Table 6.16 shows that 22 per cent of the women obtained at least one abortion in the five-year period preceding the survey. The percentage having abortion usually increases with the number of living sons. Women having daughters only have a slightly higher percentage obtaining abortion than women having one son across parity 2-4+, but a substantially lower percentage than women with sons only. The effect of sex preference on abortion is also large, overall standing at 12.7 per cent, which means that

the percentage obtaining abortion in the five-year period preceding the survey could be increased by nearly 13 per cent if son preference was absent, thereby aborting the unwanted pregnancies.

6.5 Concluding Remarks

All fertility survey and population census data have consistently shown an abnormal upward trend in China's SRB in the mid-1980s that worsened in the 1990s. In 2000, China had the world's highest SRB. Some of the provinces, whose populations are comparable to the large countries in the world, probably have produced SRBs unprecedented in human history. Surrounding the intensified increase in SRB in the 1990s in China is the context of a further drop in fertility to below-replacement level, and rapid and substantial socio-economic transition with market orientation bringing risks, insecurities and uncertainties in work and life, particularly in the urban areas. Sex-selective childbearing seems to be a family-building strategy to adjust to the changing social and economic contexts in which people live.

The 2000 census data showed that SRB was pervasively abnormal across the social strata of women; the adjusted SRBs were over 110 in most socio-economic groups. With statistical controls, younger, urban and higher educated women had higher SRBs. Women in East and South-central China had particularly higher SRBs than elsewhere. SRB at parity two or over and SRB at childbearing following female-dominated previous children were significantly higher than otherwise. With further large and universal fertility decline in China, the abnormally high SRB has spread from East to Central and West China areas, affecting 98 per cent of the total population of China; and there is also an emerging tendency for it to spread from second and higher-order births to first births. The implication is likely to be that son preference has caused increasing sex-selective abortion, resulting in substantial biases in SRBs.

Abortion can be linked to son preference in such a way that the prevalence of abortion may differ considerably according to the sex of a woman's previous children, even without sex-selective abortions (Arnold et al. 2002). Son preference creates differential stopping behaviour in fertility and abortion. Women with the desired number of sons are motivated to stop having children and therefore are more likely to abort if they get pregnant again. On the contrary, women having daughters only are more likely to

continue childbearing and less likely to abort the next pregnancy. This was confirmed with the 1997 survey data. Controlling for women's background characteristics, Cox proportional hazards models show that women who have daughters only are significantly more likely to have the next birth and less likely to abort the next pregnancy. When women had only one daughter, they were 32 per cent more likely than women with one son to have the next birth; and 20 per cent less likely to abort the next pregnancy. The results are more impressive when women had two daughters. They were 140 per cent more likely to bear the third child and 60 per cent less likely to terminate the next pregnancy. However, the independent effect of son preference is not large as compared to family planning policy, place of residence and education. The strongest effect came from family planning policy, particularly for rural women. Nevertheless, calculation of the index of sex preference effect on fertility and abortion shows that the effects were substantial: fertility would have been 11 per cent lower and abortion 13 per cent higher in the five-year period preceding the 1997 survey if son preference had not existed.

While son preference generally reduced abortion rates, it did increase sex-selective abortion. In China, the majority of abortions are not sex-selective; sex-selective abortions overwhelmingly occur to women with daughters only, who represent a small fraction of all mothers. With declining fertility, the proportion of women with daughters only has increased, but they constitute at most a fourth of all mothers according to the current family planning policy in China. But in reality, women who had daughters only and obtained a sex-selective abortion should be much fewer. To what extent sex-selective abortions have contributed to the very high SRB in China is, however, difficult to capture when nationally representative data on sex-selective abortions and other factors are lacking. As a step towards this purpose, in the next chapter, circumstances surrounding son preference are explored based on a survey conducted in East China, providing direct quantitative evidence on sex-selective abortions.

Chapter 7

Sex-Selective Abortions: Evidence from Rural East China

7.1 Introduction

China's 2000 census (NBS 2001) reports that sex ratio at birth (SRB) in China has continued rising over the last decade despite the government's considerable efforts to ban sex-selective abortion as well as 'digging out' the underreported births. For China as a whole, SRB rose from 111.3 in 1990 to 116.9 in 2000. In 1990, no province had an SRB over 120, but in 2000 there were seven provinces with SRB higher than 120. In 1990, there were seven provinces with SRB standing at normal, but only two provinces in 2000 had normal SRB.

Scholars within and outside China provide totally different explanations as to the major cause of the abnormally high SRB in China. While foreign scholars point to the predominant importance of the coercive family planning program resulting in excess female mortality from infanticide or abandonment, Chinese researchers emphasize female birth underreporting as the dominant cause of the high SRB, which would imply that the true SRB is still normal. Sex-selective abortions are considered to be a much less important cause.

The State Family Planning Commission of China in 1999 conducted a nationwide cleaning-up of the birth underreporting between 1990-1999, and expected a result of more female birth underreporting so as to justify the underreporting hypothesis for explaining the high SRB. Unfortunately the results ran counter to the expectation: surprisingly more male than female births were underreported in virtually all the provinces, and SRB of underreported births was even higher than the SRB of reported births (SFPC 2000). This unfortunately implies that the reported very high SRB may even be an underestimate of the true SRB, thus the situation is worse than it had seemed.

Many studies at the local level find that female infanticide and abandonment rarely occur particularly in the more developed East China areas where SRB was the first to be abnormal and is still highly abnormal. If female infanticide is negligible (Zeng et al.

1993; Chu 2001) while birth underreporting is in fact biased towards male infants, then sex-selective abortions must be mainly responsible for the rising and abnormal SRB in China. However, no evidence at the provincial or national level is available to support this argument. The gap in the knowledge results from the gap in data collection on this issue. This study attempts, to some extent, to fill in the gap through a survey obtaining direct quantitative evidence on prenatal sex identification and sex-selective abortion in East China. Results are presented on fertility desires and son preference, knowledge and practice of prenatal sex identification, and patterns and determinants of sex-selective abortions in the study area.

7.2 Data and Methods

Although there is debate that population statistics in China in the recent decade are subject to underreporting to varying extents in different national surveys, scholars argue that they can obtain accurate data from peasants if they do a survey themselves, not through the government channels (Interview 2003b). My survey experience in China over the last 10 years demonstrates that Chinese peasants are always co-operative and hardly ever refuse to answer questions. In fact, sometimes I was touched by their over-enthusiasm in participating in a survey. In talking to one person, not only the person himself or herself but also the neighbours will participate and provide mutually compensating answers.

Family planning in China, however, is a sensitive issue, particularly regarding induced abortion. Misuse of induced abortion in China for sex-selection is unfortunately (but not necessarily appropriately) linked to the implementation of the family planning policy. As a result, studies on induced abortion, particularly sex-selective abortion, are rare and are discouraged. The few available studies on SRB suggesting the practice of sex-selective abortion provide only indirect evidence on this issue. The first attempt at obtaining direct information on sex-selective abortion is the research by a Chinese demographer Chu Junhong (2001), who conducted a questionnaire survey and some interviews in a county in Central China where rural SRB is much higher than the average for rural China. As pointed out by Chu, the information she obtained may represent the extreme (most serious) rather than the typical situation as a result of both the selection of the survey site and the method of 'kinship networking' to collect the information.

When efforts at the regional or national level to collect information regarding sex-selective abortion are impossible, local studies are useful to provide insight into this issue. My survey (2002 Fertility and Abortion Survey) in East China is an effort of this kind, and involves some innovations as compared to Chu's. Although site selection cannot avoid some arbitrariness when taking into consideration the time and money involved, one of the considerations for choosing East China is that its SRB stood relatively closely to the national average SRB. Information obtained in East China should represent a less extreme situation than that from Central China provinces accommodating a much higher SRB than the national average.

The study county is medium-sized in terms of population. A township in the northeast of the county was chosen for the questionnare survey. Since 1998 the county's family planning information has been computerized; standardized software for family planning management is used to keep detailed records for every woman of childbearing age of her information in background characteristics and fertility history, contraceptive use and migration status. The records are updated monthly at the township level, and reported to the county family planning commission on the 5th of each month. Taking advantage of this, my survey sample was drawn from the computerized sample frame of the reproductive-age women. There are 15 villages in the survey township; five villages were randomly chosen, and 1605 married women aged 20-45 were randomly selected from these five villages.

The 10 survey interviewers (5 males and 5 females) are from two middle schools in the township, which has two middle schools located at the township town while every village in the township has its own primary school. The interviewers are middle school teachers with either a non-agricultural or agricultural household registration (*Hukou*). Those holding non-agricultural *Hukou* are usually the college graduates who are assigned to work in the middle schools, while others having agricultural *Hukou* are the previous middle school graduates and have been teaching in the middle schools for a fairly long time. At the township level, because of the shortage of teachers and university graduates being unwilling to work at the township middle schools, many of the middle school teachers are previous middle school graduates. They usually hold agricultural *Hukou* while paid by the township government, and some of them who have worked for a very long time have transferred their *Hukou* from agricultural to non-

agricultural. The teachers with non-agricultural *Hukou* are paid by the county government. Most of the middle school teachers originated from the villages in the township and are still living in the original villages. Some who live in the township town have their spouses or parents in the original villages and thus keep frequent contact, and commute to their villages.

There are two advantages in choosing the middle school teachers to be the survey interviewers. First, they come from the villages and know everything that happened in the villages; second, they are teaching the children from the villages, they are admired and respected by the villagers, and both the children and their parents in the villages listen to what they say; thus they can get accurate information from the villages. The survey strategy based on selecting the sample randomly and employing middle school teachers warrants a good data quality of the survey.

The survey was conducted between October and December 2002. It is interesting to note that in every village in the township, during November and December every year, a one-day festival takes place successively from one village to another. The festival does not have an official name, but it has been a local tradition for many years. The festival is more important than the Spring Festival, the Chinese New Year which usually occurs between mid-January and mid-February. Important events such as marriages, longevity celebrations of old people, and ceremonies to worship ancestors usually take place at the local festival rather than at the Spring Festival. Thus it is an important occasion when all family members gather together. I was told by the villagers that they usually spend much more money on this festival than on the Spring Festival. One household I interviewed said that on preparing food, they spent 3000 yuan in last year's festival (they expected 50 relatives to come), but they only spent 1000 yuan during the Spring Festival. A survey at this time ensures the presence of the selected women and provides a rare chance to observe the traditional local customs that have important demographic implications.

The empirical analysis in this chapter is undertaken in the following way. The following section presents background information on the county and township where the survey was conducted and characteristics of the sample women including their childbearing history. In section 7.4, patterns of induced abortions and sex ratios at birth are examined, together with fertility preferences. Section 7.5 describes women's

knowledge of methods for prenatal sex identification, focusing on ultrasound, the most widely acknowledged and practised method. Section 7.6 focuses on sex-selective abortions and some of the demographic characteristics associated with them. Section 7.7 conducts multivariate analyses of the factors affecting the practice of sex-selective abortion. Logistic regression models are used to examine the effects of the significant factors on the probability that a woman knows ultrasound can be used for identifying the sex of a foetus, and the probability that a woman obtains a sex-selective abortion after identifying the sex of a foetus through ultrasound. Section 7.8 discusses the circumstances surrounding son preference. Finally conclusions are drawn in section 7.9.

7.3 Background Information

The County The county has a history of nearly 2000 years (the data that follow are unpublished statistics provided by the County Family Planning Commission). It is a small county in land area, medium-sized in population but fairly large in economy. While the county's population is largely rural (62 per cent), its economy is predominantly non-agricultural. Of the total economic output, 50 per cent is industrial and 30 per cent tertiary; only 20 per cent is agricultural. The county's economic performance falls into the upper panel of China's 3000 counties (cities).

Township enterprises, having involved a rapid process of privatization over the last decade, are the major pillar of the county's economy. Seventy per cent of the rural labourers are employed in township, village or private enterprises. Cash earned from non-agricultural activities is largely spent on children's education (around 10-50 thousand yuan) and marriage: building a house and paying brideprice which could cost 100-150 thousand yuan; this has become much more expensive over the recent decade.

The county has a convenient and effective transport network linking the county centre not only to the provincial capital and the province's other counties but also to all the townships and villages within the county. High-quality highways are built in such a way that a one-hour bus drive can reach the furthest corner of the county. As rivers and lakes constitute much of the county, water transportation is also fairly well developed.

The county has four public hospitals and several specialized clinics in the county town dealing with all sorts of medicine. The hospitals are well equipped with both domestic

and foreign-made medical facilities. The family planning service station stands out prominently for offering reproductive health services including induced abortion. Typically township family planning commissions send women who are required to have abortions or sterilizations to the county family planning service station to obtain these operations.

The county inaugurated the family planning policy in the early 1970s, but did not implement it well until the early 1980s (Interview 2002a). A family planning office was set up in 1978 in the county's Bureau of Health, but the County Family Planning Commission was not established separately until 1988. During the late 1970s, the family planning policy was 'One child is not too few and two children are not too many' (*yi ge bu shao, liang ge bu duo*). In the early 1980s, the family planing policy was largely implemented by induced abortion and sterilization (for women who already had two children). In the mid-1980s, under the 'opening a small hole' policy, family planning work deteriorated. The situation was not improved until the mid-1990s primarily through campaigns aimed at induced abortions. A pre-pregnancy management approach was initiated in 1995, promoting universal contraceptive use and effectiveness to avoid unauthorized pregnancies rather than taking 'remedial measures' after conception. In 2000, a quality-of-care approach was established throughout the county, mainly involving informed choice of contraceptives and improving women's reproductive health. Contraceptives and family planning operations are provided free of charge. In addition, women who have the operations are encouraged with a 50-yuan allowance (one person-time). Fertility has declined considerably; the modal fertility preference is two children with one son at best (*zui hao you yi ge er zi*). SRB has been about 110 in recent years. Prenatal sex identification and sex-selective abortion are strictly forbidden, and severe penalties are applied when such illegal practices occur and are discovered. However, this has proved to be a tough problem, as there is not an appropriate and effective way to monitor the situation.

The Township The township, where the questionnaire survey was conducted, is roughly at the average level of the county in socio-economic development. However, according to the Township Family Planning Commission, family planning work in the township is at the 'backward' level in the county largely because of the strong son preference. Casual observation in a small village near the township town shows that

nearly all the peasants who have a daughter as their first child have subsequently had a son. This is virtually impossible if no deliberate intervention is applied.

Both the township hospital and the family planning service station are equipped with ultrasound B-machines in addition to other modern equipment. The charge for one-time use of ultrasound is 30 yuan. On the door of the ultrasound room, there is a large notice stating 'Prenatal sex identification is strictly prohibited'.

The floating population provides a serious challenge to the family planning work in the township. A large number of migrant workers are employed in the various enterprises throughout the township; migrant workers typically come from Western China provinces. The migrant workers are not well paid but have fertility well above the local average. The main method to deal with migrant workers' family planning involves inspecting them regularly and forcing them to leave the township if they are found to have high parity pregnancies (Interview 2002b).

The quality-of-care approach in family planning carried out in the township involves not only quality service for the reproductive women but also incentives for the village family planning cadres (Interview 2002c). Three persons are responsible for the family planning work in each village: the village head, village party committee secretary and village women's head. For the village head and party committee secretary, an additional allowance is provided by the township government while they are formally paid for their leadership positions. The women's head is the one most directly involved in the village family planning work. She is not only paid for this duty but also provided with old-age insurance.

The township is currently one of the two experimental areas in the county for practising villagers' autonomy and self-governance in family planning (Township government document, No.46, 2002). This has been a noticeable trend in much of China in recent years.

The Sample Women The total randomly selected sample of women is 1605, but owing to migration, the actual number of women interviewed is 1602. These are married women ranging in age from 20 to 45 and with a mean age of 32.5 years. Age at first marriage ranges from 15 to 32, averaging 21.3 years.

The percentages of women who have primary or less education, junior middle-school education and senior middle-school or more education are 24, 64 and 14 per cent respectively, with their average number of years of schooling 7.6. Forty per cent have had the experience of being a migrant worker in towns or cities inside or outside the county. Some of them have worked or are still working in Shanghai or Beijing. At the time of the survey, 41 per cent were mainly engaged in farming, 25 per cent in housework and 34 per cent in non-agricultural activities. Non-agricultural activities are mainly located in village enterprises, of which each village usually has one to three.

There are not a few cases in which female migrant workers have married local men; some of them are in *de facto* unions without legal registration but have cohabited for a fairly long time with one or two children. Such *de facto* marriages with migrant workers are inexpensive and husbands have more control over their wives. These marriages are often at young ages, as young female migrants want to have a stable life as early as possible and also find the place richer and more developed than their hometown.

Women and old parents are largely responsible for the farm work. As the amount of cultivated land is only 0.6 *mu* per head, farming is not very time-consuming. In fact, a lot of farming fields have been deserted, largely as a result of very low economic returns. At the same time, migrant workers are increasingly involved in farming while they are also employed in the village enterprises.

Women's income ranges from 500 to 120 thousand yuan, averaging 7000 yuan. Ownership of bicycles, colour TV sets, refrigerators and telephones is universal. Computers and the Internet are used by some families for collecting information about supply and demand for their agricultural and industrial products, and also advertising them.

Fertility history data collected from the survey show that 3072 pregnancies occurred among the sample women; of these 77 per cent resulted in live births and 18 per cent in induced abortions (Table 7.1). Women have currently on average experienced 1.5 live births and 0.3 induced abortions. Since the sample women have not completed childbearing, the mean number of children ever born is not their completed fertility. In

China (particularly East China) today, women at age 30 will generally have completed 90 per cent of their lifetime fertility, while women at age 35 will have completed nearly 100 per cent of the lifetime fertility; so a rough calculation of the average completed fertility of the sample women results in 1.6 births when taking into account the average age of the sample women and the assumption of even distribution of births over the age range. Thus, the fertility of the sample women stands at a level far below replacement.

Table 7.1 Pregnancy outcomes

Outcomes	Cases	Percentage	Mean
Pregnancies	3072	100.00	1.93
Live-births	2377	77.36	1.48
Induced abortions	540	17.58	0.34
Spontaneous abortions	128	4.17	0.08
Still-births	27	0.89	0.02

Source: 2002 Fertility and Abortion Survey.

Table 7.2 Comparison between the sample population and rural China

Characteristics	The sample women	Rural China
Mean values (per woman)		
Pregnancies	1.93	2.20
Births	1.48	1.74
Male births	0.79	0.94
Female births	0.69	0.80
Induced abortions	0.34	0.30
Sex ratio at birth	115.31	116.83
Abortion ratio	22.72	17.41
Timing and spacing (years)		
Age at first marriage	21.28	21.20
Age at first birth	22.62	22.54
Age at second birth	26.43	25.81
Interval between first marriage and first birth	1.34	1.35
Interval between first and second birth	3.81	3.27

Source: 2002 Fertility and Abortion Survey and 2001 National Family Planning and Reproductive Health Survey. In conformity with the age range of the sample women, data for rural China are also confined to women aged 20-45.

Table 7.2 compares the number and timing of various fertility events between the sample population and rural China as a whole. While the timing and spacing characteristics are rather similar, the sample women have lower fertility and higher abortion rates.

The sample women's average number of 1.5 births is distributed between a mean number of male births 0.79 and female births 0.69: SRB stands at 115.3. Although strong son preference persists, abandonment of female infants rarely occurs and infanticide has never occurred, at least among the sample women. Two cases of infant abandonment occurred 20 years ago at the beginning of the one-child policy. People do not know who abandoned the two female infants but tend to believe they were from other townships. When the two female infants were abandoned, they were hung in a basket on the doors of two households. The couple who adopted one of the infants were happy at that time because they had a son and were unable to have a second child according to the family planning policy.

With fertility dropping to far below the replacement level, birth spacing has lengthened. According to a village women's head interviewed, as a result of increased education, non-agricultural job opportunities and marriage costs, young people are marrying later and having longer birth spacing. As shown in Table 7.2, the sample women have an average age at marriage and first and second birth of 21.3, 22.6 and 26.4 years respectively. Thus the interval between first marriage and first birth was 1.3 years and the interval between the first and second birth 3.8 years. The government's fertility policy is around 1.5 children per couple (one-child policy when the first birth is a boy and two-child policy when the first birth is a girl), policy for the minimum age for female marriage is 20 years and for the spacing between the first and second birth, four years. Thus the sample women are generally complying with these policies.

7.4 Patterns of Induced Abortion and Sex Ratio at Birth

Evaluation of the patterns of induced abortion and SRB provides preliminary but important insight into the extent of sex-selective abortion which is presumed to be the only cause of the abnormally high SRB in the study villages. While biological SRB does vary across the nations, normal values are found to lie between 103 and 107 males per 100 females around the world (Chahnazarian 1988; Waldron 1998). SRB that substantially deviates from this normal range implies deliberate intervention to the roughly equal probability of a male and female birth. Table 7.3 presents the patterns of induced abortion and SRB occurring to the sample population. Fertility history data collected in the survey show that nearly all the fertility events occurred to the sample

women in the post-one-child-policy period (98.8 per cent of the births and 99.7 per cent of the induced abortions).

Table 7.3 Patterns of induced abortion and sex ratio at birth

Characteristics	Male births	Female births	Total births	Induced abortions	Abortion ratio	Sex ratio at birth
Age						
20-34	665	571	1236	326	26.38	116.46
35-45	608	533	1141	214	18.76	114.07
Birth order						
1st	803	753	1556	35	2.25	106.64
2nd	384	296	680	291	42.79	129.73
3rd+	86	55	141	214	151.77	156.36
Period						
Before 1990	516	486	1002	117	11.68	106.17
After 1990	757	617	1374	423	30.79	122.69
Education						
Primary or lower	342	322	664	151	22.74	106.21
Junior middle school	803	682	1485	327	22.02	117.74
Senior middle school +	128	100	228	62	27.19	128.00
Income						
Low	182	157	339	69	20.35	115.92
Medium	882	768	1650	379	22.97	114.84
High	207	177	384	91	23.70	116.95
Total	1273	1104	2377	540	22.72	115.31

Source: 2002 Fertility and Abortion Survey.

The overall SRB of the sample women stood at 115.3. Table 7.3 shows that SRB varies substantially across time, birth order and education level, while there is no marked difference between the two broad age groups and across income level. The distorted SRB is largely a phenomenon of the recent period, second or higher-order births and higher-educated women. The abortion ratio is correspondingly higher in these groups than among their counterparts. This is likely to indicate the extent of these groups' practice of sex-selective abortion that caused their very high SRBs.

Sex-selective abortion is the proximate determinant of the rising SRB, while culturally and economically determined son preference in the Chinese society is the root of the issue. In order to capture the extent of son preference, there is a range of questions in the survey asking the ideal number and ideal sex composition of the children and the desired sex of the birth at each pregnancy. Generally child preference in China is expressed to be son preference plus preference for a balanced sex composition of two

children. This has been documented consistently over the range of surveys in China over the last two decades (Feng and Zhang 2002; Jiang 2002).

Of the sample women, 22 per cent want to have only one child, while 76 per cent want to have two children; 97 per cent of the women wanting two children prefer to have both a son and a daughter, and a slightly higher percentage (1.8 per cent) want two daughters compared to the percentage preferring two sons (1.4 per cent). As a result, the sex ratio of the ideal two children stands only at 99.3. However, among the women wanting only one child, 46 per cent prefer to have a son, 28 per cent to have a daughter and 26 per cent prefer either sex. Thus, the sex ratio of the ideal one child, when assigning values of 50 per cent sons and 50 per cent daughters for preference of either sex, is very high at 144.3. After taking into account the women wanting more than three children, the overall sex ratio of the ideal number of children stands at a moderately high 109.1, lower than the actual SRB of these women. Thus, in this ideal situation, women's child number preference is below replacement fertility (the average ideal number of children is 1.8) but son preference persists, largely because of strong son preference among the women wanting only one child.

However, when the question was asked of women at each pregnancy what sex of the child they desired, the desired SRB was surprisingly high. While the ideal SRB is 109.1, the desired SRB stands at 143.1. Table 7.4 shows that, across the birth order, the desired SRB exceeds the actual SRB by an increasingly larger amount. Looking at SRB more concretely, at each birth order, women who desired a son are actually much more likely to have had a son, while women who desired for a daughter are also more likely to have had the daughter at the first two birth orders. For birth order 3+, highly male-biased sex-selective childbearing was occurring regardless of women's sex preference. Impressively, women without sex preference have had the normal SRB across the birth order. The results show that women's ideal fertility preference, desired fertility preference and actual fertility outcome can differ tremendously. But overall strong son preference is obvious.

Table 7.4 Desired and actual sex ratio at birth

Preferences	Total births	Birth order 1	Birth order 2	Birth order 3+
Desired	143.05	130.80	156.97	264.52
Actual	115.31	106.64	129.73	156.36
Want a son	155.69	130.15	172.56	212.20
Want a daughter	94.79	83.58	97.13	116.67
No preference	102.47	101.99	105.88	105.71

Source: 2002 Fertility and Abortion Survey.

Despite the very high desired SRB at the first birth, people rarely exercise interventions to achieve their desire. Virtually all women interviewed said that they did not care about the sex of the first child, and some even said they wanted their first child to be a girl, because according to the family planning policy they can have a second child whose male sex can be ensured through sex-selective abortion, consequently meeting their preference of a balanced sex composition of two children.

At birth order 2, people began to deliberately take prebirth interventions much further increasing the likelihood of a male birth when the first child is a girl, and increasingly do so at higher birth orders in the absence of a son.

With son preference, women's abortion rates may differ according to the sex of the previous children even if sex-selective abortions are not used (Arnold et al. 2002). Table 7.5 presents the percentages of pregnancies ending in induced abortion or live-birth over the 10 years before the survey according to the sex of living children in 1992. The abortion rate is much higher for women having sons only than for those having daughters only, and the women with daughters only have twice or more the male birth rate of the women with sons only. Again, son preference plus a preference for a balanced sex composition of children is observed. The highest abortion rate occurred to the women having both sons and daughters, who also exhibit a higher male than female birth rate, also an indication of son preference.

Table 7.5 Percentage of pregnancies ending in live birth or induced abortion in the 10 years preceding the survey, according to the sex combination of the living children in 1992

Number and sex of living children	Male births	Female births	Induced abortions	Number of pregnancies
One child				
1 boy	19.39	31.63	42.86	196
1 girl	38.01	20.25	35.20	321
Two children				
2 boys	11.11	22.22	44.44	9
1 boy+1girl	25.00	10.00	57.50	40
2 girls	57.78	11.11	26.67	45
Three or more children				
all boys	-	-	-	0
boys+girls	40.00	0.00	60.00	5
all girls	50.00	10.00	10.00	10

Note: row percentages do not necessarily add up to 100 because of pregnancies ending in spontaneous abortions or stillbirths.
Source: 2002 Fertility and Abortion Survey.

7.5 Use of Methods for Sex Identification

In China, modern as well as traditional methods have been used for the purpose of sex identification of a foetus. Traditional methods, including pulse diagnosis and herbal medicines, were widely used in rural areas well before the introduction of the modern techniques. A study by Peng and Huang (1999) in Central China found that the traditional Chinese method, pulse diagnosis, was proved to be 84 per cent accurate in identifying the sex of a foetus. Traditional methods continue to be used in rural areas despite the rapid expansion of the modern techniques.

Modern methods for prebirth sex identification, including ultrasound, amniocentesis and chorionic villus sampling, began to be used in some Asian populations in the late 1970s and early 1980s, and spread quickly in China in the 1990s. However, the ultrasound-B scan is the predominant and most widely available method in China. As reliable and convenient as it is, nearly everyone knows B-*chao* (Chinese term for ultrasound-B scan). This awareness is partly established by the family planning program which carries out pregnancy checkups regularly (but not compulsorily) for

women at childbearing ages to monitor the use of contraceptives and occurrence of unauthorized pregnancies, as well as the development of a foetus. The other two modern methods are little known, let along practised in rural areas.

In the study villages, 76 per cent of the interviewed women know about ultrasound, 36 per cent know about pulse diagnosis, only 9 per cent know about amniocentesis (Table 7.6). However, most of the women did not use these methods for prenatal sex identification. About 12 per cent used ultrasound and seven per cent used pulse diagnosis for sex identification. Women who revealed knowledge of these methods were also asked the sources of their knowledge. Table 7.7 shows that more than 50 per cent obtained the knowledge of ultrasound and pulse diagnosis from relatives, friends and neighbours, and another 25 per cent from medical personnel. When asked which method people usually trust, most women (72 per cent) said ultrasound. People tend to trust in what they know well and practise often. Although pulse diagnosis is fairly widely known, it is the method that people trust least.

Table 7.6 Knowledge of methods for sex identification

Whether used	Ultrasound		Amniocentesis		Pulse diagnosis	
	Cases	%	Cases	%	Cases	%
No	377	23.53	1459	91.07	1028	64.17
Yes and did use	187	11.67	4	0.25	111	6.93
Yes but did not use	1038	64.79	139	8.68	463	28.90
Total	1602	100.00	1602	100.00	1602	100.00

Source: 2002 Fertility and Abortion Survey.

Table 7.7 Source of knowledge of methods for sex identification

Sources of knowledge	Ultrasound		Amniocentesis		Pulse diagnosis	
	Cases	%	Cases	%	Cases	%
Family members	74	6.04	8	5.59	79	13.76
Relatives, friends or neighbours	659	53.80	48	33.57	324	56.45
Medical personnel	304	24.82	39	27.27	132	23.00
Family planning personnel	82	6.69	8	5.59	6	1.05
Mass media	104	8.49	40	27.97	32	5.57
Others	2	0.16			1	0.17
Total	1225	100.00	143	100.00	574	100.00

Source: 2002 Fertility and Abortion Survey.

Sixty-five per cent of the interviewed women believe that the practice of ultrasound is universal; however, only 33 per cent of the pregnancies were examined at least once using ultrasound. Among these pregnancies, 42 per cent used ultrasound once, 34 per cent used twice and 24 per cent three times or more. Multiple use often involved sex identification and obtaining the service at different places for cross-check of the accuracy of sex identification. A general impression from interviews from the study villages is that supportive views for sex identification are widespread, but practices mostly occur after the first birth.

A question was asked of women who had an ultrasound-B scan at least once about the purpose of ultrasound use. A clear pattern is observed, as shown in Table 7.8. Overall, 28 per cent of ultrasound use was for sex identification; this proportion rose perceptibly from the first to the second and third-plus pregnancy. Few women obtained ultrasound at the first pregnancy for sex identification, while most women did so at the third or higher-order pregnancy. During the interview, a 62-year-old woman told me that wives nowadays are luckier to have the modern technology. She has four children, but the first three are daughters. If ultrasound for sex identification had been available at her time of having children, she would only have wanted two children by stopping at the second birth with an ensured son through ultrasound. A more impressive example is a 59-year-old woman who has three sons. While she is much admired by many other women who have daughters only, both she and her husband said that they only wanted two children if the second was a daughter. They went on to have the second and third births because they wanted a daughter, but unfortunately they had to stop at three sons. Bringing up three sons is a huge burden; this could have been avoided if the modern technology had been available during the 1970s.

Table 7.8 Purpose of ultrasound use

Purposes	Total		1st pregnancy		2nd pregnancy		3rd+ pregnancy	
	Cases	%	Cases	%	Cases	%	Cases	%
Usual check	734	71.96	527	91.49	154	60.87	53	27.75
Sex identification	286	28.04	49	8.51	99	39.13	138	72.25
Total	1020	100.00	576	100.00	253	100.00	191	100.00

Source: 2002 Fertility and Abortion Survey.

Two questions were asked about the first use of ultrasound: first use of ultrasound occurred at what gestation period and where. As Table 7.9 indicates, the majority of the first use occurred at second-trimester pregnancies. The higher the pregnancy order, the more likely the first use occurred at late gestation period (not shown in the Table). Sixty-five per cent of the first use occurred at hospitals, 16 per cent at family planning stations and 17 per cent at private clinics (Table 7.10). Across the pregnancy order, the proportion occurring at family planning stations remains lowest and similar, the proportion at hospitals declined by half while the proportion at private clinics increased sevenfold. The patterns observed in Tables 7.9 and 7.10 strongly suggest that ultrasound was used at second and higher-order pregnancies for identifying the sex of the foetus.

Table 7.9 Gestation period at which ultrasound was first used

Months	Cases	%
1	63	6.18
2	71	6.96
3	237	23.24
4	231	22.65
5	185	18.14
6	120	11.76
7	65	6.37
8	41	4.02
9	7	0.69
Total	1020	100.00

Source: 2002 Fertility and Abortion Survey.

Table 7.10 Place where ultrasound was first used

Place	Total		1st pregnancy		2nd pregnancy		3rd+ pregnancy	
	Cases	%	Cases	%	Cases	%	Cases	%
County hospital	342	33.53	208	36.11	85	33.60	49	25.65
Township hospital	321	31.47	230	39.93	67	26.48	24	12.57
County family planning station	78	7.65	44	7.64	18	7.11	16	8.38
Township family planning station	81	7.94	47	8.16	20	7.91	14	7.33
Private clinic	178	17.45	35	6.08	59	23.32	84	43.98
Others	20	1.96	12	2.08	4	1.58	4	2.09
Total	1020	100.00	576	100.00	253	100.00	191	100.00

Source: 2002 Fertility and Abortion Survey.

The usual health check by ultrasound per person-time costs 30 yuan at the township hospital (Interview 2002d). However, when bribed, the practitioner may take the risk of illegal medical practice in identifying a foetus's sex for the pregnant woman. I was told that a doctor in the township hospital has his family in one of the study villages; many years ago a couple who are related to the doctor's wife in the village sought help from this doctor for introducing the ultrasound practitioner, bribed the doctor with 200 yuan and some good wine, and obtained the ultrasound service in the evening when the hospital was closed. I was also told there was a lawsuit last year involving the county hospital where a couple induced abortion of a male foetus when the doctor had told them it was a female foetus during ultrasound. As both parties broke the law, they were punished; the doctor was removed from his post. Some private clinics increasingly ran the risk for an increasingly high price. The price of an ultrasound-B scan for sex identification has gone up from 300 to 500, 700 and even 1000 yuan in private clinics in the recent past. Last year, great efforts and severe penalties were used in the county to regulate all the private clinics with an ultrasound-B machine. Administrative punishment, heavy fines and revoking the medical licence were applied concurrently. The director of the County Family Planning Commission said that they punished a doctor who revealed the sex of the foetus of a woman in her first pregnancy and just wanted to know the child's sex, not for the purpose of sex-selection. This woman is an urban resident and a friend of the director; she was delighted to be expecting a child and was just curious to know its sex. The local regulation stipulates that in any circumstances sex identification is prohibited.

However, interviews with some family planning cadres show that they themselves partly support use of ultrasound for sex identification. They think one son is necessary while two or more than two sons are too many, and it is by all means reasonable to have one son through use of ultrasound and sex-selective abortion. They argued that the practice of ultrasound and sex-selective abortion facilitates the implementation of the family planning policy, and indeed, family planning work has become much easier now than before, as more and more peasants no longer want two or more children but want at least one son through the practice of ultrasound and sex-selective abortion. One of the male interviewers expressed his unique view on this: 'I would suggest an ideal family planning policy of two children consisting of one son and one daughter. Couples with the first child a daughter can legally practise prenatal sex identification and sex-selective abortion in order to have a son at the second birth, while couples with the first

child a son can also do so in order to have an additional daughter. Then the couples are sterilized after achieving two children of balanced sex composition. I think this will solve all the problems in family planning. Fertility is low, sex ratio is balanced and family planning work will be very easy and successful.'

7.6 Sex-Selective Abortions

Direct evidence of sex-selective abortions was obtained in the study villages. Before discussion of the details of the data, a simple simulation is given to assess the importance of the effect of sex-selective abortion on SRB. Table 7.11 shows the results produced from a very simple simulation in which all women will have one to six children with a biological SRB of 105. When the number of children increases, the proportion of women with daughters only declines quickly. In this situation (without sex preference), SRB will be exactly 105 at all parity. However, starting from parity 5, if 100 per cent of the women with daughters only practised sex-selective abortion to ensure a son, then SRB will ascend quickly when fertility declines. Even if all women have four children (fairly high fertility), sex-selective abortion occurring to the 5.7 per cent of women with all daughters at parity 4 will lead to an abnormally high SRB of 111.1. In view of this, the further increase in SRB in China over the last decade may theoretically be a result of merely the practice of sex-selective abortion.

Table 7.11 Hypothetical situations of distorted SRB resulting from the presumed sex-selective abortions

Number of children	% with no sons	SRB with assumed sex-selective abortions
1	48.78	
2	23.80	171.13
3	11.61	122.66
4	5.66	111.13
5	2.76	107.35
6	1.35	105.46

Source: author's own calculations.

In the study villages, direct information was obtained on sex-selective abortion by asking women whether or not they had a sex-selective abortion after the sex of the

foetus was determined through ultrasound; 5.6 per cent of the women had sex-selective abortions. Table 7.12 shows that among the 109 sex-selective abortions, 101 or 93 per cent were of female foetuses.

Table 7.12 Sex-selective abortions

Number of abortions	Total	Male	Female
1	75	8	67
2	12		12
3	2		2
4	1		1
Total number of women	90	8	82
Total number of abortions	109	8	101
per cent of abortions	100.00	7.34	92.66

Source: 2002 Fertility and Abortion Survey.

Looking at the reasons for obtaining an abortion, 20 per cent of the abortions are sex-selective (Table 7.13). This percentage increased from eight per cent at the first pregnancy to more than double at the second pregnancy, and nearly tripled at the third-plus pregnancy. Sex-selective abortions were largely obtained after the first birth. Table 7.13 also shows that contraceptive failure constitutes one of the major reasons for abortions, particularly at higher-order pregnancies. It is interesting to observe the pattern associated with the most important reason that differs across the pregnancy order: personal reasons (58 per cent) at the first pregnancy, policy restriction (44 per cent) at the second pregnancy and contraceptive failure (41 per cent) at the third-plus pregnancy. Such a pattern is typical of rural China.

Table 7.13 Distribution of abortions by reasons

Reason	Total		1st pregnancy		2nd pregnancy		3rd+ pregnancy	
	Cases	%	Cases	%	Cases	%	Cases	%
Contraceptive failure	166	30.74	9	25.00	69	23.79	88	41.12
Policy restriction	191	35.37	3	8.33	128	44.14	60	28.04
Child's sex is not ideal	109	20.19	3	8.33	54	18.62	52	24.30
Personal reasons	74	13.70	21	58.33	39	13.45	14	6.54
Total	540	100.00	36	102.86	290	100.00	214	100.00

Source: 2002 Fertility and Abortion Survey.

As clearly shown in Table 7.14, the gestation period of sex-selective abortions contrasts sharply to those for non-sex-selective purposes. While 85 per cent of the non-sex-selective abortions are first-trimester procedures, 95 per cent of the sex-selective abortions occur at the second (85 per cent) or even third trimester (10 per cent) of pregnancy, despite the fact that 60 per cent of the interviewed women are aware that late-term abortions are associated with serious health consequences. However, nearly 60 per cent of the interviewed women are unaware of the illegality of sex-selective abortion.

Table 7.14 Gestation period of induced abortions

Months	Total		Non-sex-selective		Sex-selective	
	Cases	%	Cases	%	Cases	%
1	91	16.85	91	21.11		
2	192	35.56	190	44.08	2	1.83
3	89	16.48	86	19.95	3	2.75
4	47	8.70	25	5.80	22	20.18
5	53	9.81	17	3.94	36	33.03
6	46	8.52	11	2.55	35	32.11
7	14	2.59	6	1.39	8	7.34
8	8	1.48	5	1.16	3	2.75
Total	540	100.00	431	100.00	109	100.00

Source: 2002 Fertility and Abortion Survey.

7.7 Factors Affecting Sex-Selective Abortion

After examining the patterns and characteristics of sex-selective abortion, this section looks into the factors affecting sex-selective abortion. Data were collected on women's attitudinal variables as well as their demographic and socio-economic characteristics. This section conducts multivariate analyses of sex-selective abortion to reveal the influential factors with statistical controls.

Data from two questions underlie the dependent variables. Whether a woman knows ultrasound can be used for identifying the sex of a foetus, as shown in Table 7.6, is the dependent variable in the first model examining the factors affecting women's knowledge of methods for prenatal sex identification. Whether a woman has ever

obtained a sex-selective abortion after identifying the sex of a foetus through ultrasound, as shown in Table 7.12, is the dependent variable in the second model examining the factors affecting women's practice of sex-selective abortion. Since the dependent variables are binary, coded 1 if yes and 0 if no, logistic regression is an appropriate multivariate method used here to analyse the effects of the demographic and socio-economic factors on women's knowledge and practice of sex-selective abortion. The basic equation of the logistic regression is:

$$\ln\left(\frac{p}{1-p}\right)=b_0+b_1X_1+b_2X_2\ldots b_nX_n,$$

where the dependent variable is specified in terms of the odds of a woman having the knowledge of methods for prenatal sex identification (in the first model) or a woman having obtained a sex-selective abortion (in the second model), $\frac{p}{1-p}$; the variables X_i (i=1, 2, ..., n) on the right-hand side of the equation represent the independent variables.

For the knowledge model, there are seven independent variables, however, six are categorical and are thus recoded as dummy variables. Women's education attainments are divided as 'Primary school or lower', 'Junior middle school' and 'Senior middle school plus'; 'Primary school or lower' is the reference category. Income level is classified as 'Low income', 'Medium income' and 'High income'; 'Low income' is the reference group. A question was asked if the woman has experience of being a migrant worker in towns or cities; the variable that captures this is 'Migration experience', versus 'No migration experience' if the woman did not have this experience. 'Non-agricultural work' represents the major economic activity of a woman versus 'Agricultural work'. Two attitudinal variables capture women's desire for a son: family line continuation by sons (Do you think only sons can carry on the family line?) and old-age support by sons (Do you think only sons can provide old-age support to you?). 'Family line continuation by son' and 'Old-age support by son' are both dummy for sons. Finally 'Age' is an interval variable representing a woman's age in years. Table 7.15 shows the logistic regression results for the factors affecting women's knowledge of ultrasound for sex identification.

Table 7.15 Logistic regression model of the probability that a woman knows ultrasound can be used for identifying the sex of a foetus

Covariates	Number of cases (n)	Odds ratio univariate model	Odds ratio multivariate model
Age	1592	0.91***	0.92***
Education			
Primary school or less (ref)	382	1.00	1.00
Junior middle school	1022	2.00***	1.77***
Senior middle school+	188	2.83***	2.62***
Income			
Low income (ref)	373	1.00	1.00
Medium income	955	1.30	1.08
High income	264	1.27	1.07
Migration experience			
No (ref)	951	1.00	1.00
Yes	641	2.43***	1.79***
Major economic activity			
Agricultural work (ref)	1056	1.00	1.00
Non-agricultural work	536	1.58***	1.33*
Family line continuation by son			
No (ref)	990	1.00	1.00
Yes	602	1.21*	1.48**
Old-age support by son			
No (ref)	1013	1.00	1.00
Yes	579	0.93	1.19
Number of observations (N)		1592	1592
Model Chi-square			150.69***

*P<0.05; **P<0.01; ***P<0.001. (ref)=reference category. Calculated using SPSS 11.0.

Source: 2002 Fertility and Abortion Survey.

Most of the socio-economic variables have a significant effect on women's knowledge. Older women are less likely to have the knowledge; the age effect is significant but small. The higher a woman's education, the more likely she is to have the knowledge. The significant odds ratios for junior and senior-secondary-plus educated women is 1.8 and 2.6 times that of the least educated women, respectively. Income does not significantly influence women's knowledge. Women's migration experience does influence women's knowledge significantly: women who have the experience are 1.8 times more likely than those without the experience to have the knowledge. Women who are migrant workers in the cities are exposed to all sorts of up-to-date information and share the experiences of others, thus they are more likely to have the knowledge under consideration. The same applies to women involved in non-agricultural activities, as women doing non-agricultural work have odds of the knowledge 33 per cent greater than women engaged in agricultural activities. Women who believe only sons can carry on the family line are significantly more likely to have the knowledge. This association could be established by strong son preference generated from this belief which led to seeking information for methods of sex-selection. However, women's attitude towards sons' role in old-age support does not significantly affect their knowledge although the effect is in the expected direction in the multivariate model.

Women's knowledge of methods for sex-selection is the first step towards the practice of sex-selective abortion. Table 7.16 models the factors affecting women's practice of sex-selective abortion. The socio-economic variables in the model are the same as those in the 'knowledge' model; a few demographic variables are added. 'Period a birth occurred' is a variable indicating the period when a birth occurred. Period is broadly divided into 'Before 1990' and 'After 1990', hypothesizing that births which occurred in the period after 1990 are more likely to be sex-selective. Since son preference is documented as particularly associated with female births, the variable 'Sex composition of children' is entered into the model to test this association. Women's age and number of births are the control variables.

Table 7.16 Logistic regression model of the probability that a woman obtained a sex-selective abortion

Covariates	Number of cases (n)	Odds ratio univariate model	Odds ratio multivariate model
Age	1509	0.99	1.01
Number of births	1509	1.79***	1.42
Education			
Primary school or less (ref)	375	1.00	1.00
Junior middle school	974	0.91	1.08
Senior middle school+	160	0.49	0.80
Income			
Low income (ref)	361	1.00	1.00
Medium income	892	1.15	1.17
High income	256	1.81	1.90
Migration experience			
No (ref)	911	1.00	1.00
Yes	598	1.30	1.31
Major economic activity			
Agricultural work (ref)	1013	1.00	1.00
Non-agricultural work	496	0.92	1.17
Family line continuation by son			
No (ref)	932	1.00	1.00
Yes	577	3.27***	2.95***
Old-age support by son			
No (ref)	944	1.00	1.00
Yes	565	1.80**	2.16**
Period a birth occurred			
Before 1990	423	1.00	1.00
After 1990	1086	4.93***	5.48***
Sex composition of children			
All boys	625	1.00	1.00
All girls	429	4.48***	6.51***
Both boys and girls	455	4.44***	2.83**
Number of observations (N)		1509	1509
Model Chi-square			92.08***

*P<0.05; **P<0.01; ***P<0.001. (ref)=reference category.

Source: 2002 Fertility and Abortion Survey.

The results are interesting in that all of the socio-economic variables are non-significant while most of the demographic and attitudinal variables are significantly affecting women's practice of sex-selective abortion. Although more educated women are more knowledgeable, they are not necessarily more likely to practise sex-selective abortion. Income variables are not significant in the model although their effects are in a consistent direction. Migration experience does not significantly influence women's practice of sex-selective abortion. Women's economic activity has a coefficient that is not statistically different from zero. The traditional belief in continuation of the family line by sons has a highly significant effect, leading to women being three times more likely to obtain sex-selective abortion. The view of sons' utility in old-age support also significantly affects the likelihood of obtaining sex-selective abortion: women holding this view are twice as likely to have a sex-selective abortion. The period when a birth occurred has a highly significant effect, suggesting that births which occurred in the recent period are much (5.5 times) more likely to be sex-selective. A more impressive finding is the very high and significant odds ratio for 'All girls'. If women's births are all girls, they will be more than 6.5 times more likely to practise sex-selective abortion than those with all male births. Also women who have both male and female births have a significant odds of a sex-selective abortion that is nearly three times that of the women with all male births. These findings are expected and also reflect many of the similar situations reported elsewhere (Poston et al. 1997; Graham et al. 1998; Qiao 2002; Chen 2002). A general conclusion is that in the study villages, practice of sex-selective abortion is significantly influenced by the cultural belief that only sons can carry on the family line, and to a lesser extent, by the economic consideration of old-age support by sons. With the increased desire for a smaller family size in the recent period, births are much more likely to be sex-selective now than in the past. This may also apply to rural China as a whole, with a pronounced increase in SRB following female births over the last decade.

7.8 Circumstances Surrounding Son Preference

Sex-selective abortion leading to abnormal SRB in the study area, as well as in China in general, is associated with the son preference inherent in the socio-cultural institutions of Chinese society. It seems that while China's family planning program and socio-economic changes have brought about the most dramatic demographic transition—

unprecedented fertility decline, son preference plus the same reproductive technology have resulted in another similarly unprecedented demographic transition—a transition from low, normal SRB to high, abnormal SRB. China's economic reform and modernization have substantially changed the context in which Chinese peasants live and work; to adjust to this change, they no longer want many (more than two) children. However, the traditional marriage and family system has not been eroded, and son preference persists. Modern technologies mediate these two conflicting processes, resulting in rising SRB.

Zhao (1997) has convincingly argued that Chinese peasants did not produce as many children as biologically capable over history, rather they achieved family size and structure goals through family-building strategies involving deliberate control via spacing, abortion and adoption. Interviews with some of the oldest old people in the study villages show that in most cases, they would have preferred to have 3-4 children (at least two sons) and state that they have actually had more children than they wanted. While child number preference has declined greatly from the old to the young generation, son preference remains strong.

Fertility preference has three components: how many, at what time and what sex. Traditionally Chinese peasants want many children, have early childbearing and prefer sons to daughters; this is determined both culturally and economically. When the peasants in the study villages were asked why they want children and why they want at least a son, they laughed, implying that this is just a natural process without justification. It is natural and common that when children reach 20 years old or so, the surrounding people will ask and care about whether they have found their marital families. When a couple has been married for a few months, the neighbours will also be gossiping about whether the bride is pregnant. Indeed, some of the young people who migrated to towns or cities for jobs said one of the reasons why they migrated was to avoid the gossip and hence the pressure from the villagers.

To understand the fertility preference of the Chinese peasants, one needs to understand the 'life world' in which the peasants live (Chen and Mu 1996). Living in a 'life world' rooted in a village culture, the ultimate life goal of the peasants is to carry on the family line and contribute to family prosperity. Peasants see themselves as a link in the chain of life that has descended from the ancestors; it is their indispensable mission to

continue the chain. To have children or to have male children is a necessary prerequisite to perpetuate the chain from generation to generation. Indeed, from the village study, it is found that having and bringing up a male child is in all respects an economical loss. A male child's economic costs are always larger than the benefits to his parents, both now and in the past.

The childbearing demands of the Chinese peasants are an integration of a range of normative requirements and secular considerations. The most fundamental is the demand of the ultimate life value, that is, what they live for, which is achieved by having children. Happiness in life is largely involving in having children, and a family is only complete when there are children. The villages under study use very plain language to state this demand: to be human is to produce human beings. To have children, bring them up, get them married, have grandchildren, receive filial piety and worship from children and grandchildren, and to themselves be ancestors. Following this cultural arrangement, their life values and desires are achieved at different stages in their lifelong pursuit of family building, continuation and prosperity. Younger generations are reproduced with the similar cultural values and behavioural norms, and older parents place hopes on them to realize what they have been unable to achieve, particularly in 'bringing honour to their ancestors' (*guang zong yao zu*). Thus, to get married and to have children is more than natural without involving any justification.

Associated with son preference is the male-based family continuation, which is a cultural or institutional arrangement in a patriarchal society: male-based right of inheritance of family name and property (Ye 2002). The Confucian patriarchal tradition in China is typically patricentric (*fu quan*), patrilineal (*fu xi*) and patrilocal (*fu ju*). Patricentricity is associated with labour division between the two sexes in such a way that husbands and adult males are responsible for the field work and earnings outside the home, and females for housework and childcare at home, and with inequalities in income distribution and in decision-making power over household affairs between the two sexes. Patrilineality and patrilocality deny women's rights in inheriting family name and property, providing old-age support, joining in ceremonies to worship the ancestors and handling the funeral affairs of the seniors. One of the traditional beliefs (a famous saying of Mencius) is that 'Of all unfilial deeds none is more serious than the failure to produce male descendants' (*bu xiao you san wu hou wei da*), so 'May you

have no male heir!' (*duan zi jue sun*) is the most venomous curse to any family in China.

Socio-economic considerations for having children are the most practical elements of the childbearing demands of the peasants. In village culture, the power and influence that peasants can exert, the reputation that they enjoy and the admiration and respect that they receive are usually linked to how many male children they have. A prevailing saying in the study villages is: "Sons bring good reputation while daughters bring good fortunate" (*er zi shi min qi, nu er shi fu qi*). Economically, the demand for children is the demand for labour and old-age security. Interestingly peasants believe that they need children's support not only in the present world (when they are alive *yang jian*) but also in the other world (when they are dead *ying jian*). Children's support is necessary for them to have a happy life in the other world.

Both my survey and other studies (see Jiang 2002) in China have documented considerable changes in the fertility preference of Chinese peasants. They no longer want many children and have early childbearing. The traditional belief 'More (male) children, more happiness and prosperity' (*duo zi duo fu*) is no longer held by most peasants. Zhao (1997) even casts doubt on the popularity of this belief in historical China. Indeed, in the study villages, neither the oldest old nor the young couples agree to this belief. Both their own experience and what they have observed elsewhere suggest that many sons not only bring considerable hardship, but also, instead of taking and sharing responsibility in providing quantity and quality support, show unreliability and unfiliality when several sons compete with each other not to be too outstanding, and conflicts frequently occur. On the other hand, the costs involved in bringing up a child have grown exponentially over the last two decades with the socio-economic transition in China. The hardships and costs of bringing up two sons today are much more greater than in rearing more than three sons before the economic reform.

However, one son seems to be an unshakable demand. Peasants frequently state that the best choice is 'one son and one daughter', less desirable is 'an only son or two sons', but unacceptable is 'an only daughter or two daughters'. It is implied that having a son is essential. However, peasants think both sons and daughters are important and serve different purposes. In my survey, women were asked the purpose of having a male and a female child. The major considerations for having a son include 43 per cent for

continuation of the family line, 38 per cent for old-age support, eight per cent for labour and five per cent for strengthening the husband-wife relationship, while the purpose of having a daughter is expressed as 28 per cent for family completeness, 24 per cent for old-age support, 23 per cent for expansion of relative ties, 14 per cent for help in housework, and also five per cent for strengthening the husband-wife relationship.

Persistence of son preference is associated with the fact that sons and daughters are valued more culturally than economically. Historically, there were marked excessive economic benefits of male children when people lived on traditional agriculture and received support in their old age from sons. However, economic reform has drastically changed the circumstances in which male children are highly economically valued. First, children are increasingly in school before they marry. At the same time, when they graduate from middle school, they either continue to higher education or migrate to cities for non-agricultural jobs. The study county is much overpopulated and has considerable surplus agricultural labourers where the cultivated land per head is among the lowest in China's counties. At the same time, mechanization in agriculture has increasingly reduced manual labour-based farming. The labour value of male over female children has become largely nonexistent. Second, rural industrialization has substantially enhanced the economic value of female children. More and more females work in rural enterprises in light industries including food processing, handicrafts and clothing. Silk embroidery, which is one of the most important and well-known activities in the county, is overwhelmingly a job for females. In much of the tertiary sector, females are much more likely to be employed over a wider range of activities. At the same time, female children tend to contribute more monetary benefits to parents. While average incomes for male and female migrant workers in the cities are roughly similar, parents usually receive more remittances from daughters. Most of the villagers interviewed state that daughters can save more money than sons, who largely use up what they earn by drinking, smoking and making friends. However, childrearing costs are much greater for a son than for a daughter. When a daughter marries out, her parents receive a large amount of brideprice from the bridegroom's parents; the brideprice is estimated to be 20 thousand yuan in this county. The bridegroom's parents need to build a house equipped with furniture and household electronic appliances: the expenditure for this could be as high as 100 thousand yuan. When either of the two conditions is not met, the bride will not marry into the bridegroom's family. Finally, a son's contribution to old-age support tends not to be much greater than a daughter's

despite the fact that daughters are traditionally not obliged to support their parents. When parents are healthy and capable, they tend to live separately and on their own. They need children's support only at the very end of their lives when their functional capacities for daily living begin to decline. Villagers say that for financial support, the first source is the spouse, the second is sons and the third is daughters. However, in care-giving, the first is still the spouse, the second is daughters and the third is sons or daughters-in-law. Also daughters prepare and pay much more for parents' clothing. When a daughter marries out, she is still available to her native family.

Despite the changes described above, peasants still view sons and daughters differently. The crucial difference is that only sons can carry on the family line. Although there are many instances of uxorilocal marriages in which the son-in-law provides old-age support, the daughter's children still inherit the family name of her husband, and the parents' own family name cannot be carried on. Also importantly, many rich peasants only want to bequeath the wealth in their own families through sons, while giving the money to daughters means giving the money to other families. These attitudes can explain why more developed areas tend to have stronger son preference. In East China, the highest SRB was observed in the areas where rural industrialization occurred most rapidly in China and peasants' income is among the highest. In the more developed areas, the economic value difference between a son and a daughter virtually disappears, while cultural value is still predominantly male-assumed.

Thus, of the childbearing demands of the peasants, those that are cultural and psychological are more resistent and thus slow and difficult to change, while those that are social and economic are more readily altered either by the force of modernization or by the implementation of the family planning policy. Of the three components of fertility preference of Chinese peasants, the core is sex preference; more marginal is that concerning number and timing. This is why the number and timing preference are negotiable while son preference has strongly persisted over the last two decades of family planning implementation. On the one hand, China's family planning program has considerably reduced fertility along with delayed childbearing and lengthened birth spacing; on the other hand, the one-child policy had to be modified to open 'a small hole' for the peasants with daughters only.

7.9 Concluding Remarks

Prenatal sex identification and sex-selective abortion were made illegal in China in 1986 when SRB began to deviate from the normal range (MOH & SFPC 1986). Since then more than 10 regulations and notices including laws have been issued and enforced to prohibit and eliminate such illegal practices. However, SRB continued to rise throughout the 1980s and 1990s. In 2001, China enacted a population and family planning law which articulates the circumstances surrounding the illegality and criminal offence of prenatal sex identification and sex-selective abortion (See the translation of the Law by Winckler 2002). Despite these measures, the use of ultrasound for sex identification, and sex-selective abortions, have been increasing in much of China. The 2000 population census results show that while SRB stands strikingly high at over 150 for second or higher-order births, SRB at first birth tends also to deviate from the normal level. China's 2001 National Family Planning and Reproductive Health Survey (SFPC 2002) even reports an average SRB at first birth of 110.0 between 1996 and 2001 (106.4 between 1990 and 1995).

Considerable efforts involving both government officials and scholars have been made to examine the trends and characteristics of SRB in China, and to suggest possible explanations or speculations for the abnormally high SRB. The view that SRB in China is only statistically abnormal largely as a result of underreporting of female births has been shaken by the countrywide effort in cleaning up (*qing li*) the underreported births, which surprisingly comes up with more male than female birth underreporting. As female infanticide rarely occurs, the only possible reason has to be sex-selective abortion, as is the case of South Korea and Taiwan. To fill the gap in data collection and knowledge on this issue, this study integrated quantitative and qualitative surveys to investigate the context and degree of son preference, use of ultrasound for sex dentification and subsequent sex-selective abortion in rural East China.

East China, although more developed than the rest of China, was the first to show abnormally high SRB in the early 1980s. In the early 1990s, abnormally high SRB spread to Central China, and in the early 2000s, further to West China. The geographic expansion of the abnormally high SRB has been coincidentally following the spread in time and space of ultrasound-B techniques from the coastal to inland China (Gu and Xu 1998). This modern invention mediates the two conflicting processes: desire for a

smaller family size and persistence of son preference, resulting in increasing deviation of SRB from normality.

Desire for a smaller family size is not solely the result of the implementation of the family planning policy. In East China in particular, the rapid economic growth and radical social changes have dramatically changed the context in which the peasants live and work. Adjusting to this, peasants no longer want more than two children. In fact, in the study villages, peasants did not exhibit very high fertility desires even before the family planning policy. Many old women state they had more children than they wanted, and if reproductive technologies including sex-selection had been available at their time of childbearing, their fertility would have been lower. Traditional beliefs surrounding the benefits of many (male) children are fragile, but the cultural arrangement of son preference in a patriarchal society still dominates the reasoning and practice of childbearing.

Data from the study villages suggest that sex-selective abortion takes almost sole responsibility for the abnormally high SRB when there is little evidence of female infanticide, adoption and underreporting. While 76 per cent and 36 per cent of the interviewed women respectively know ultrasound and pulse diagnoses for sex identification, correspondingly 12 per cent and seven per cent made us of them. Subsequently about six per cent had sex-selective abortions. One-third of the pregnancies among the sample women were examined by ultrasound; of these 28 per cent were for sex identification. This proportion increased from less than 10 per cent at the first pregnancy to more than 70 per cent at the third and higher-order pregnancies. Associated with this, the percentage obtaining ultrasound in private clinics rose from six per cent at the first pregnancy to 44 per cent at the third and higher-order pregnancies.

The dominant reason for obtaining an abortion is nevertheless not the sex of the foetus. At first pregnancy, 58 per cent of abortions were associated with personal considerations; at second pregnancy, policy restriction accounted for 44 per cent; while at higher-order pregnancies, failure of contraception practised when no more children were desired was responsible for 41 per cent. This is a pattern believed to be typical of rural China. The percentage resulting from undesired sex of the foetus was eight per cent at first pregnancy, which was doubled and tripled at the second and at third-plus

pregnancies. Among the reported 109 cases of sex-selective abortions, 93 per cent (101 cases) were of female foetuses. Compared to the abortions for non-selective purposes, sex-selective abortions were largely second- or even third-trimester procedures despite the relatively high awareness of serious health consequences associated with late-term abortions.

Multivariate analysis demonstrates that knowledge of ultrasound for sex identification is associated with such women's characteristics as higher education, migration experience, non-agricultural work and the traditional belief in sons carrying on the family line. However, the practice of sex-selective abortion is associated significantly with demographic rather than socio-economic variables. The belief in sons to continue the family line and to provide the old-age support, and the period at which a birth occurs, significantly result in sex-selective abortion. Sex-selective abortions are highly significantly more likely to occur in families where all births are girls. With the increased desire for a smaller family size in the recent period, births are much more likely to be sex-selective now than formerly.

The evidence from this study suggests that son preference will continue as long as the cultural context for son preference continues, and legislation outlawing prenatal sex identification can hardly make a difference. The severely biased SRB implies grave consequences in the near future, more so in some areas than in others, as discussed in some of the recent studies (Li et al. 1995; Guo and Deng 2000; Chen 2002). It is suggested by some studies that social policy beyond family planning, addressing gender equity involving empowerment of women and advancement of reproductive health, is necessary to reduce the extent of son preference (Gu and Roy 1996; Chu 2001; Qi and Chu 2002). 'Eliminating the son preference and stopping prenatal sex determination are the two necessary sides of one coin' (Qi and Chu 2002). However, such an effort poses a great challenge to the society of China which has a history of over 2000 years of Confucian ideology.

Chapter 8

Summary and Conclusion

8.1 Introduction

Despite the fact that previous studies have revealed some important trends with the small amount of valid published data, abortion in China has been neither well documented nor systematically examined. There had been fervent debate around abortion in China; however, some basic and important questions central to policy relevance remained unsolved. What are the levels and trends in abortion in China over the last few decades? How important is abortion in China's fertility decline? Has the powerful government family planning program been able to erase abortion differentials? What individual, community and regional factors can explain the variability of abortion among individuals and across the provinces? How is son preference linked to abortion? How prevalent is sex-selective abortion causing a rising sex ratio at birth in China? All these questions are of crucial importance, yet have not been adequately addressed, largely because of the sensitivity of the questions, unavailability of reliable data and lack of careful analysis of the existing data sources.

This thesis has addressed this void using mainly quantitative methods and using data from fertility surveys and censuses conducted in China over the last two decades. The purpose of this study is to fully explore the trends, patterns and determinants of abortion in China. The analysis started with assessment of levels and trends of abortion rates in China in the context of changing abortion policies, family planning programs and socio-economic development. The Bongaarts model of proximate determinants of fertility was used to evaluate the role of abortion in China's fertility decline as compared to the other major components of fertility. It then examined differentials and variations in abortion at the individual, community and regional level. The socio-economic characteristics of abortion were more fully explored in a multivariate context, addressing what factors had significant influence on abortion incidence by looking at the net effect of each of the variables when other variables are statistically controlled. The study particularly addressed the effect of son preference on reproductive behaviour and sex-selective abortions, and discussed the circumstances surrounding son

preference. This concluding chapter summarizes and discusses the empirical findings from this research.

8.2 China's Abortion Transition

Worldwide evidence showed that abortion played an important role in initiating, promoting and sustaining fertility decline; abortion transition was an integral component of fertility transition. Many populations, in both the developed and developing areas, have gone through three stages of fertility transition, from little birth prevention, to primary reliance on abortion, and to major reliance on contraception with some residual abortions for contraceptive failure. Thus over the course of fertility transition, in the initial to mid-stage abortion rises, reaching varied high levels among the populations, then turns down at the advanced stage when modern contraception takes over the abortion role. Such a pattern was observed in Western Europe, North America, Eastern Europe, Japan, and many developing countries in Asia and Latin America (Omran 1971; van der Tak 1974; David 1999; Norgren 2001). China generally followed this pattern, although less dramatically than the neighbouring countries or areas that resemble the culture and experienced a similar rapid fertility decline.

It is observed that major patterns of abortion prevalence appeared to be the sharp contrast between countries in the West and East and between socialist (both formerly and currently) and non-socialist countries. This has much to do with religious or cultural traditions and social systems. Abortion has a much higher cultural tolerance in the oriental countries than in the West. Both the beginning of life and the attitude towards abortion in the countries of Buddhist religion or Confucianism are defined differently from those in the West. No conflict exists between abortion and Confucian teaching. No stigma is attached to abortion in Chinese culture. In contrast, the Western religions hold a much less tolerant approach to abortion (Moore-Cavar 1974). Protestantism has a total or near total condemnation of abortion; Roman Catholicism is strongly opposed to abortion, even for therapeutic reasons; the Orthodox Church also firmly prohibits abortion. In addition, these religions are against all forms of contraception and even sexual behaviour not for reproductive purposes. This is why there is a long-standing controversy on abortion and contraception in the West, while in China no religious, moral or political dispute appears. Abortion legalization proceeded rapidly in China, while in the West this has been a prolonged and inconsistent process.

Political ideology also had a major influence on the abortion pattern in the socialist or formerly socialist countries. Soviet Union was the first socialist country; it was also the first country in the world to liberalize the abortion law. All the socialist countries including the USSR and Eastern European countries, China, Vietnam and Cuba have or have had very high abortion rates. Abortion rates in the USSR and Eastern European countries have been the highest in the world over the last five decades. There have been three reasons for elective abortion in these countries (Chandrasekhar 1974; David 1999). First, women's freedom is of paramount importance in the socialist society, abortion is a theoretically favoured approach to the liberation of women, and no woman in a socialist society should be forced to bear a child against her will. Second, socialist teaching encourages women to participate equally in all social, economic and political spheres, women 'hold up half the sky', women are encouraged to work outside the home on equal terms with men; the state has the responsibility to provide facilities for postponing motherhood, preventing unwanted births and limiting family size. The final reason involves the health consequences of illegal abortions under criminal abortion laws. However, there are variations to meet particular national needs in abortion legalization. China, for example, has obviously involved demographic purpose. Both the Chinese culture and the population policy permit even second- or third-trimester abortions.

Like fertility transition and as one of the major proximate determinants of fertility, abortion transition in China was strongly influenced by the family planning policy. Abortion data published in China date back to 1971 when the nationwide family planning program was carried out. Despite there being no representative nationwide abortion figures before the 1970s, some regional reports and estimates show that there was a steep rise in abortion cases during the second family planning campaign in the early 1960s. However, this was mainly an urban phenomenon, particularly of the large cities. The abortion ratio was well below one per cent in the 1950s, but increased to 6.5 per cent in 1965. The abortion ratio in Shanghai in 1964 was very high at 100 per cent: one induced abortion for every live birth. In 1971 when the third family planning campaign was instituted, the abortion number and ratio were twice as high as those of 1965.

During 1971-1978, the total abortion rate (TAR) was around 0.7 while the total fertility rate (TFR) was reduced by 50 per cent, from 5.4 to 2.7. The extraordinary fertility decline was apparently not the result of use of abortion; the remarkable increase in abortion rates occurred with the introduction of the one-child policy in 1979. In the following three to four years, abortion number and rate more than doubled, reaching a peak TAR of 1.7 in 1983. Throughout the 1980s (except for 1984), abortion numbers stood at 10-14 million per annum. However, TFR largely fluctuated around 2.5 in the 1980s with only some slight decline. The hight abortion rate continued into the early 1990s. The abortion number in 1991 reached a similar height of that in 1983: in both years over 14 million abortion procedures were performed. The introduction of the one-child policy and birth quotas in the early 1980s, policy relaxation in the mid-1980s followed by tightening up in the late 1980s, and the use of the "one-vote veto" system in the early 1990s are the major underlying forces of the abortion levels and trends over this period. With fertility dropping to below replacement level and quality-care family planning services, the abortion rate has fallen since the mid-1990s. Despite the numerous and coercive abortions, China's abortion rate is moderate by international standards: in the late 1990s it was lower than the world average. China's high abortion rates in the 1980s were considerably lower than the very high rates observed over the 1950s-1970s in the two neighbouring countries, South Korea and Japan, and in most of the other socialist or formerly socialist countries.

Although available statistics cannot isolate quantitatively the abortion effect on fertility decline for most countries, calculations for China, South Korea and Japan suggest that the role of abortion was crucial, but comparatively it was moderate in China's fertility decline. In the 1970s and 1980s when Korean fertility was dropping rapidly, abortion averted a total fertility rate of 1-1.4 births per woman. More dramatically in Japan, from the 1950s to the 1970s, fertility would be twice as high as its actual level if abortions were removed. In contrast, in China even in the peak abortion periods, total fertility averted by abortion was about 0.8 births per woman. The three countries share a similar culture and all have experienced very rapid fertility decline. Substantial use of abortion in fertility transition is evident in the countries or areas of Chinese culture.

Scholars outside China argue that China's family planning program relies heavily on induced abortion to control fertility. This is not the case, however, as is demonstrated by the Bongaarts model of proximate determinants of fertility, which enables an

exercise of decomposing fertility change into the contributions from its four principal components: nuptiality, contraception, abortion and postpartum infecundability primarily determined by duration of breastfeeding. In the early 1970s, the major fertility-inhibiting factor appeared to be postpartum infecundability, followed by deferred marriage and contraceptive use. In the late 1970s, marriage postponement increased to be the greatest inhibitor. The abortion effect was almost negligible during much of the 1970s. As China vigorously promoted and placed priority on preventive measures and made modern contraception universally available and free of charge, and the vast majority of women were using IUD and sterilization, contraceptive use has become the largest fertility-inhibiting factor since the early 1980s. Despite the increasing contribution of abortion, its fertility-inhibiting effect is only a third of the other two major components.

A more interesting perspective is to look at the role of the various proximate determinants in fertility reduction over the period under study. TFR dropped from 5.4 in 1971 to 1.8 in 1999, a 67 per cent decline or a reduction of 3.6 births per woman. Of this reduction, nearly 50 per cent or 1.8 births was from deferred marriage, 89 per cent or 3.2 births from contraceptive use, 15 per cent or 0.5 births from abortion, while postpartum infecundability operated in the opposite direction: an increase of 53 per cent or 1.9 births. Over the three decades, changing family planning policies and regulations produced a varied combination of the factors. In the 1980s, for example, revisions of the marriage law and the economic reform brought down women's age at marriage; and in the 1990s, the abortion rate declined markedly. These circumstances exerted an upward effect on fertility. In all other times, marriage, contraceptive use and abortion, in varied combinations, produced and sustained fertility decline. It is clear that in China, over the period 1971-1999, over 70 per cent of the fertility decline occurred in the 1970s before the one-child policy, largely through postponing marriage and limiting and spacing childbearing using modern contraceptives. The coercive nature of the one-child policy including forced or persuaded abortion contributed much less importantly to the rapid fertility decline, despite marriage postponement and contraceptive use also involving some degree of coerciveness.

8.3 Abortion Differentials and Determinants

In this study, three levels of characteristics of abortion were examined: individual, community and provincial. In spite of the powerful influence of the government family planning policy on fertility and abortion in China, there are considerable variations in fertility and abortion at all the three levels. These substantial variations provide a basis for the study of factors causing such variations.

In a regional perspective, substantial abortion differentials are due to differentials in family planning policies and policy strength, local cultural customs, political institutions, and socio-economic development. Until recently the government had a very tight control over the urban residents through both their workplace and their residence. The majority of urban women have employment outside home. Urban areas also have better technical services of the family planning program, which was carried out earlier and more rigidly in urban areas. All these have contributed to much higher abortion rates in urban than rural areas. The share of urban population is an important factor in provincial variations in reproductive behaviour.

Provincial differentials in abortion are also attributable to the diversity of the policy and socio-economic circumstances surrounding fertility decision-making. Population policies are localized to suit particular conditions. Gaps in socio-economic development have been widening between the provinces. Political leaders are not uniformly committed, and subcultures of childbearing and kinship systems vary somewhat across the provinces. Ethnic diversity is a strong influence in abortion differentials across the provinces.

At the rural community level, women have higher abortion rates in more developed than in less developed communities. At the individual level, there is considerable variation in abortion rate according to women's age, prior reproductive experience, education, place of residence, ethnicity, and knowledge and attitudes towards abortion.

Worldwide evidence suggests that women of higher socio-economic status are more likely to have abortions as they have greater competing reasons to terminate a pregnancy than to carry the pregnancy to term. Abortion patterns are similar in China. Urbanized, higher-educated and Han majority nationality women are invariably more

likely to abort a pregnancy and have repeated abortions. Two variables representing largely family planning policy effects are particularly associated with considerable variations in abortion incidence. Chinese policy changed over time, and policy strength differed across provinces. Women obtaining abortions in the recent period with a more rigid family planning policy, and in the provinces with greater policy strength, have experienced a markedly higher incidence of abortion.

To what extent do these different level factors independently influence women's abortion behaviour? The multivariate analysis undertaken to isolate the effect of each factor showed that when age and number of pregnancies are controlled for, policy period, region (policy strength) and place of residence have the largest effect on abortion incidence. Women in the recent period, living in East China provinces (first category of provinces, i.e. with greatest policy strength) and residing in urban areas, are ~~is~~ several times more likely than other women to experience an abortion or repeated abortions. Women's past reproductive experience, particularly the number of children they already have, has the second largest effect on abortion incidence or repeated abortions; this is expected in the context of China's parity-specific fertility policy. Education, particularly secondary education, also has a dramatic influence on women's abortion experience. Rural community variables have the smallest yet still significant effect. Women in communities that are equipped with tap water and electricity, are located closer to the county seat and have higher average income, have a significantly higher abortion rate than others. The effect of women's knowledge and attitudinal variables suggests that when development and family planning policy tend to contribute to an increased abortion rate, improved contraceptive effectiveness and services are crucial to reduce abortion incidence and repeated abortions.

So relatively speaking, at the individual level, family planning policy had the largest effect on women's abortion incidence, followed by women's past reproductive experience and women's individual socio-economic characteristics. This is particularly the case for rural women. The results support what people generally believe, the dominant role of the family planning program in shaping reproductive behaviour in China.

Then, how about at the provincial level? A multivariate analysis of regional-level variation in abortion was conducted to address the degree to which socio-economic

development and family planning policy are related to abortion rates. Fertility analysis of this kind has demonstrated the independent, significant effect of both the family planning policy and socio-economic development on subregional fertility variation in China. A similar result would be anticipated in abortion. Unlike the fertility studies addressing such issues, this analysis used the principal component method to extract the socio-economic and family planning factors which represent a range of variables that may suffer from multicollinearity when they are regressed in a single model.

Overall both social and economic development and family planning policy have significant independent effects on abortion rates at the provincial level. The three factors generated by the factor analysis representing economic, social and policy components had roughly equal large effects on provincial abortion variation. Unlike the case at the individual level, the family planning policy effect at the provincial level is not the biggest; it is in fact slightly smaller than that of economic and social components. This may be because the provincial-level data analysed here are from the mid-1990s, whereas the individual-level data from the 1997 survey were accumulated past experience. As indicated in Chapter 2, fertility in the 1990s was determined more by socio-economic development than by family planning policy, although both effects were highly significant. The relationship appeared to be consistent in the case of both abortion and fertility.

However, the three factors differ substantially in their independent importance across parities. The family planning effect is apparently parity-specific, while economic development influences abortion incidence at all levels of parity. The relative strength of these forces is that economic and social developments play a dominant role in abortion at parity one and two, and family planning implementation does so at higher parities. No effect from family planning policy was observed on abortion at first parity. Family planning policy became increasingly important after first parity; this is highly consistent with the requirements of Chinese family planning policy. Thus, the implication is that with declining fertility, the role of family planning policy in abortion incidence will be increasingly replaced by socio-economic development.

8.4 Abortion in the Context of Son Preference

Son preference is an inveterate cultural tradition in China; it is an integration of a range of normative requirements and secular considerations. The basic issue underlying son preference is the male-based continuation of the family. Patricentricity, patrilineality and patrilocality are basic elements of the Confucian patriarchal society. If there can be said to be a religious belief in China, it is the belief in continuation of the family line through sons. Despite the growing economic value of girls and growing importance of daughters in old-age support, the family line can be carried on only through sons. Son preference has been practised for thousands of years in China; it did not represent a social problem until recently when fertility declined to replacement and below-replacement levels. It is the rising, abnormal sex ratio at birth (SRB) that has attracted considerable international attention. The trend emerged in the mid-1980s and worsened in the 1990s. By 2000, China had the world's highest SRB (117). The abnormal upward trend in SRB spread across region and parity. The seriousness of this problem appears to be unprecedented in human history.

Analysis of 2000 census data showed that controlling for women's background characteristics, women who had daughters only or had more daughters than sons were observed with markedly higher SRB (over 200) than the normal range, and this typically occurred at parity two or over. The SRB of women who had no previous children or had only sons was exactly normal. The relationship between number of abortions and SRB is also striking, as reported from the 1997 fertility survey. When women's number of abortions increased from one to two and three, the SRB jumped from 109 to 121 and 144. The 2000 census data also showed that controlling for other variables, younger, urban and higher-educated women had higher SRB than their counterparts; this was probably the result of sex-selective abortions, as these women were likely to have better access to medical facilities and sex-selective techniques, while they also tended to have lower fertility.

Abortion may be linked to son preference in two ways: first, son preference creates differential stopping behaviour according to the sex of living children; when the desired number of sons is not achieved, women are less likely to abort the next pregnancy. Second, son preference directly leads to sex-selective abortions when a foetus of non-preferred sex is determined. The first may cause sex imbalance only at family or small

local levels, while the second can result in abnormal SRB at the population and society level. The extent to which abortion is linked to these two ways is explored in this research using the 1997 fertility survey data and the author's field survey data.

Controlling for women's background characteristics, Cox proportional hazards models show that women who have only daughters are significantly more likely (32 per cent more likely when the first child is a girl and 140 per cent more likely when the first two children are daughters) to have the next birth and less likely (20 per cent and 60 per cent less likely respectively) to abort the next pregnancy. However, variables showing the largest effects in aborting the next pregnancy are again family planning policy and place of residence. Nevertheless, calculation of the index of sex preference effects on fertility and abortion shows that fertility could be reduced by 11 per cent and abortion increased by 13 per cent in the five-year period preceding the 1997 survey if son preference were removed, demonstrating that the quantitative effects of son preference on fertility and abortion are substantial in China.

While women who had daughters only were less likely to abort the next pregnancy, once they obtained an abortion, it was more likely to be sex-selective. Both theoretically and empirically, only six per cent of women obtaining sex-selective abortions can cause SRB to reach as high as 110-115. Evidence from China and South Korea appeared to demonstrate that abnormal SRB is likely to occur when fertility approaches replacement level. When fertility is over three births per woman, the desire for at least one son is largely met through frequent childbearing. The very small proportion of families with all daughters can adopt one son from families with all sons. However, desire for a smaller family size while maintaining son preference makes it impossible for extra sons to be adopted. When fertility declines to replacement level, couples replace frequent natural childbearing by sex-selective controlled childbearing. When modern techniques are not available, traditional methods are sought and practised. Introduction of highly reliable techniques greatly facilitates the process involved in family-building strategies. China's three most recent population censuses, those of 1982, 1990 and 2000, which basically cover the period of the one-child policy, consistently documented the increasingly abnormal SRB both over time and across the regions while fertility reached replacement and below-replacement level; so the trends and patterns of the abnormal SRB that strikingly follows the availability and popularity

of the ultrasound-B method across both time and regions suggest that sex-selective abortions are the major force driving the increasing deviation of SRB from normality.

However, most of the China SRB studies provide only indirect information or even speculation on the extent to which sex-selective abortion contributed to the abnormal SRB. To shed light and obtain evidence on this issue, the author, integrating both quantitative and qualitative surveys, investigated the context and degree of son preference, use of ultrasound for sex identification and subsequent sex-selective abortion in rural East China.

East China, the most developed area in China, is the first to experience abnormal SRB. The rapid economic development and radical social changes have dramatically changed the context in which the peasants live and work. Traditional beliefs surrounding the benefits of many (male) children are fragile; however, the cultural institution of son preference in a patriarchal society still dominates the reasoning and practice of childbearing. Adjusting to the changing circumstances, peasants in East China no longer want more than two children; and many only want one child.

Data from the field survey showed that the sample women had an average number of 1.5 births with SRB at 115. It is estimated that the completed fertility of the sample women would be 1.6 children, which is far below the replacement level. The distorted SRB was largely a phenomenon of the recent decade, second or higher-order births and higher-educated women. However, women's desired SRB (143) was much higher than the actual SRB. Even the desired SRB of the first births stood as high as 131. But in fact, people rarely exercise interventions to achieve the desired sex of the first child. The prebirth interventions only started abruptly at birth order two. According to the sex of the previous children, women's abortion rates differed substantially. The abortion rate is much higher for women having sons only than those having daughters only, and the case of women with daughters only having a subsequent male birth is two or more times more likely than that of women with sons only. The highest abortion rate was observed among women having both sons and daughters.

The survey results suggest that sex-selective abortion took the sole responsibility for the abnormal SRB as there was little evidence of female infanticide, adoption and under-reporting. Most of the women had knowledge of ultrasound for sex identification,

but not so many did so. About six per cent of women obtained sex-selective abortions. The sample women had 540 abortions, of which 20 per cent (109) were sex-selective abortions. Among the reported sex-selective abortions, 93 per cent (101 cases) were of female foetuses. Since ultrasound cannot detect the sex of a foetus before 20 weeks gestation, sex-selective abortions, in contrast to abortions for non-selective purposes, were largely second- or even third-trimester procedures despite the relatively high awareness of serious health consequences associated with late-term abortions.

Multivariate analysis demonstrates that knowledge of ultrasound for sex identification is associated with such women's characteristics as higher education, migration experience, non-agricultural work and the traditional belief in sons carrying on the family line. However, the practice of sex-selective abortion is associated significantly with demographic rather than socio-economic variables. The belief in sons to continue the family line, and to a lesser extent to provide the old-age support, the period at which a birth occurred, and the sex of the previous child highly significantly result in sex-selective abortion. With the increased desire for a smaller family size in the recent period, births are much more likely to be sex-selective now than in the past.

Increasing use of sex-selective abortion is more marked and visible evidence of son preference when smaller family size is desired either for normative or policy reasons, or some combination of the two (Poston 2001). However, with the rapid decline of fertility, people are increasingly aware that high fertility is no longer a convenient, economic and effective approach addressing their family size goals (Tu 1993; Peng and Huang 1999). Sex-selective strategies, particularly sex-determined induced abortion, are preferable to parents, and the wider application of ultrasound-B technology in China since the early 1980s has reduced both the monetary and psychological costs of sex selection (Peng and Huang 1999). Unfortunately, repeated abortions for achieving the desired number and sex of children are associated with considerable health consequences for women under extraordinary pressure to have one or more male children.

Many governments, feminists and human rights groups have been concerned with the practice of induced abortion in countries with compulsory family planning programs, and repeatedly voiced the opinion that abortion must never be used as a family planning method (Tu and Smith 1995). However, sex-selection based abortions in China are not

the inevitable result of the family planning policy. Whether or not there is a family planning policy, and whether or not people are voluntarily controlling fertility, sex-selective abortions are inevitable as long as people want fewer children and want those to be male. Recent increases in the sex ratio at birth in China's big cities suggest wider application of sex-selective abortions. Other Asian societies, particularly Taiwan and South Korea, that share the same Confucian patriarchal tradition, strongly and pervasively prefer sons. In these areas sex ratios at birth have also been distorted substantially through sex-selective techniques, but neither has a heavy-handed family planning program similar to that carried out in Mainland China (Gu and Roy 1996; Poston 2001).

The rising and abnormally high SRB in China, as a result of sex-selective abortions, has important implications for the demographic transition theory. Critics of the demographic transition theory hold that the theory is not effective in predicting the demographic trends after World War II. Three major demographic trends have gone beyond the demographic transition theory: the postwar baby boom in the Western countries, significant mortality decline in the developing world, and the rapid fertility decline in the Asian countries (Chen and Huang 1999). Now it seems that the demographic transition theory is unable to capture a fourth demographic trend—rising SRB—that is occurring in some of the Asian societies (i.e., Mainland China, Taiwan, South Korea and India) experiencing rapid fertility decline. The rapid decline in mortality and fertility in the developing countries is attributable to the substantial social and economic changes and technological progress largely transmitted from the developed countries. The same reproductive technology development has now resulted in another demographic transition, a transition from low, normal SRB to high, abnormal SRB in these countries.

Recent debate (see a discussion by Li 2001) in China over the post-transitional fertility points to the importance of looking at China's demographic transition both quantitatively and qualitatively. Conventional measures assessing the demographic transition are crude birth and death rates or total fertility rate and life expectancy. The present values of these measures in China are clear indications of the end of the transition from high to low fertility and mortality. Quantitatively, China has completed demographic transition, largely as a result of the implementation of a stringent family planning policy although socio-economic development has also played an important

role. However, even without changes in fertility preference, the fertility level could be brought down by exogenous forces. The strong son preference was conflicting severely with the one-child policy, resulting in the policy change that had to incorporate and accommodate this sex preference. This is a qualitative aspect of the demographic transition in China, and only the endogenous forces, that is, socio-economic development, can finally make a difference. In fact, at least in East China where socio-economic development is much more advanced than in the rest of China, the intensity of son preference has declined. Peasants want at least one son and at most two sons. Not very many want two sons and virtually no one wants more than two sons. As one son is the cultural boundary, only further modernization would lessen this preference. The central government's decision in 2000 on strengthening population and family planning work and stabilizing the low fertility has called for the effort to normalize SRB by 2010. However, until Chinese society is fully modernized such an effort would make little difference. The demographic transition needs to be regarded as an integral component of the overall transition of the society from a traditional to a modern one. Efforts promoting the demographic transition need to be addressed within a framework of comprehensive development and modernization.

When demographic transition is discussed, replacement-level fertility (2.1 births per woman) is typically taken as the measure of the completion of a demographic transition. However, replacement fertility is dynamic rather than static if it is looked at in a historical perspective. Replacement fertility is a product of three things: mortality, fertility and sex ratio at birth. Historically when mortality is very high, replacement fertility should also be very high: for example, according to the Coale-Demeny 'West' model life table, when life expectancy at birth stands at only 30 years, replacement fertility would be as high as 4.4. When the demographic transition reaches its end, replacement fertility is calculated to be 2.1 under the assumption of life expectancy at birth being 70-75 years and SRB being 105 or 106. However, when SRB is distorted to be abnormally high, a replacement fertility taking into account of this, other things being equal, would also become abnormally high. Calculation based on China's 1995 life table shows that the 1995 replacement fertility in China would be 2.31 when taking into account the 1995 SRB of 116, while a normal SRB of 106 would produce a replacement fertility at 2.14. Thus China's demographic transition realities have important implications for demographic transition theory, which typically assumes replacement fertility to be the endpoint of the transition.

8.5 Limitations and Future Research

No study can do everything in any field. This is particularly true for this study of abortion in China taking into account the complexity of the abortion issue and the limitations of the available data. Owing to the type of data used and also data unavailability, there are limitations in this research which have implications for future research. One important limitation is inherent in the type of data collection in the 1997 fertility survey, that is the exclusion of never-married women in the survey; this is a common problem in all the national fertility surveys in China. However, several studies in the 1990s in urban China suggest that premarital sex and abortion have increased substantially in the large cities. One recent survey (Xu and Liu 2001) conducted in two hospitals in Beijing asked questions on sexual knowledge and behaviour of 487 unmarried girls who came to have premarital medical examinations. The results showed that 50 per cent had had premarital sexual relations; of these 60 per cent had ever obtained an abortion. With further increases in education and delays in marriage, the single population may grow and so will premarital sexual activities. The exclusion of single women from the fertility survey leads to underestimate of fertility and abortion, at least in the younger age groups and in urban areas.

A second limitation is that some important socio-economic characteristics of individual women were not included in the 1997 fertility survey, for example, women's occupation, migration status and income. Occupation has become one of the most important individual characteristics in a modern society. Occupation diversity has grown both in urban and rural China, and is highly related to income difference. Many studies have shown that these characteristics significantly influence women's reproductive norms and behaviour. However, the 1997 survey did not include women's occupation. There was an income variable, but this is a rural community-level variable. Migration status is also very important, as it changes people's perspectives on fertility and the circumstances surrounding fertility decision-making. Migration is dominated by young people who are sexually active. Some studies have noted that the migrant population makes an important contribution to the rising abortion rate among the urban unmarried; and China in 2000 had a migrant population of 138 million. Exclusion of these characteristics may have lost important information in explaining and determining women's reproductive behaviour.

There are some other questions in the 1997 survey, for example, fertility preference and contraceptive use, that have not been adequately used owing to the improper or inadequate information they captured. In addition, the relatively small sample size of the 1997 survey led to some random errors when the data were broken down by multiple cross-tabulation to analyse abortion patterns.

Another major limitation of the research is the inability to address the health consequences of abortion due to the unavailability of such data. Neither the 1997 survey nor the author's field survey included any question regarding health impairments resulting from abortion, although they did include questions asking about women's awareness of health consequences. There are few published data on abortion-related morbidity and mortality available from the Ministry of Health. However, when available, the data neither permit an international comparison, nor enable some simple analysis of trends and patterns.

These limitations are the gaps for future research. Surveys and studies particularly need to be done to document and understand the levels and trends, and the surrounding circumstances and influencing factors in sexual, contraceptive and abortion behaviour among the unmarried or migrant population. They are also important areas for the family planning program to extend its coverage and improve its services. Addressing abortion in the unmarried and migrant population is, to a large extent, addressing the future of abortion in China.

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Annex 1 Technical Notes for Chapter 3

The Bongaarts model of proximate determinants of fertility (Bongaarts 1978, 1982; Bongaarts and Potter 1983) is a multivariate fertility model expressed by the following equation:

$$TFR = C_m \times C_c \times C_a \times C_i \times TF \qquad (1)$$

where C_m, C_c, C_a and C_i are, respectively, the index of marriage, contraception, induced abortion and postpartum infecundability, with their values ranging from 0 to 1. The smaller the values, the larger their effects. TF is total fecundity rate, the maximum biological capacity for human childbearing, and for most populations its values fall within the range of 13-17 births per woman. In its application to China, TF value of 17 is used (Qin 1989; Gao et al. 1989; Kang and Wang 1989).

Formulas for calculating index of marriage, contraception, induced abortion and postpartum infecundability are as follows:

Index of marriage: $C_m = \frac{TFR}{TM} = \frac{\sum f(a)}{\sum [f(a)/m(a)]}$

where $f(a)$ is age-specific fertility rate, $m(a)$ is the proportion of currently married. If all women at reproductive ages are married, then $m(a)$=1, C_m=1, TFR is only influenced by C_c, C_a and C_i. In the absence of marriage, TFR is 0, C_m=0. TM is total marital fertility.

Index of contraception: $C_c = 1 - 1.08ue$

where u is the contraceptive prevalence rate and e average use-effectiveness of contraception. The figure 1.08 captures the effect of sterility. If all fecund women are contracepting with 100% effectiveness, $1.08ue$=1, C_c=0, TFR=0. Otherwise, in the absence of contraception, u=0, C_c=1, and TFR is only influenced by C_m, C_a and C_i.

Index of induced abortion: $C_a = TFR/[TFR + 0.4(1+u) \times TAR]$

where u is the contraceptive prevalence rate, $0.4(1+u)$ represents number of births averted by one abortion, *TAR* is total abortion rate, thus $0.4(1+u)\times TAR$ represents total number of births averted in a woman's lifetime by abortions. In the absence of abortion, C_a=1, *TFR* is only influenced by C_m, C_c and C_i. If all pregnancies are aborted, C_a=0, *TFR*=0.

Index of postpartum infecundability: $C_i = 20/(18.5+i)$

where 20 represents the typical average birth interval without lactation, i is the average duration of infecundability from birth to the first postpartum ovulation. i is estimated through its functional relationship with duration of breastfeeding:

$$i = 1.753\times\exp(0.1396\times B - 0.001872\times B^2)$$

Owing to its simplicity and the availability of the required data, the Bongaarts model of proximate determinants of fertility has been widely used in fertility and family planning research over the last two decades, and has been shown to be robust. In this application to China, C_m, C_c and C_a are estimated directly using the above proposed formulas, but C_i is estimated as the residue of the model simply because of the lack of duration of breastfeeding data, thus is expressed as C_r. The estimated results of the indices for China over 1971-1999 are presented in Table 3.4.

The major objective of the applications of the model is the estimation of the fertility-inhibiting effects of the proximate determinants. The observed fertility is the outcome of the joint effect of the proximate determinants on the *TF*. To assess the relative contribution of each of the proximate determinants to the generation of the observed fertility, the multiplicative model (1) can be expressed as the following additive model using logarithmic transformations:

$$\ln\left(\frac{TFR}{TF}\right) = \ln C_m + \ln C_c + \ln C_a + \ln C_i \qquad (2)$$

where ln denotes the natural logarithm transformation. The relative contribution of each of the proximate determinants to the reduction of fertility from the *TF* to the *TFR* can then be calculated as:

$$\ln C_x \Big/ \ln\left(\frac{TFR}{TF}\right) \quad \text{or} \quad \ln C_x/(\ln C_m + \ln C_c + \ln C_a + \ln C_i) \qquad (3)$$

where C_x is to be replaced, respectively, by C_m, C_c, C_a and C_i. The percentage contributions calculated from formula (3) will sum to 100%, providing a comparison of the relative magnitudes of the fertility-reducing effects of the proximate determinants (Casterline et al. 1984). The decomposition results for China over 1971-1999 are shown in Figure 3.10.

However, any change in a population's level of fertility is necessarily caused by a change in one or more of the proximate determinants. Thus, an issue of great interest is to look at the contribution of the proximate determinants to the fertility change over a period under study. This is assessed with a similar approach described in equations (2) and (3). Such a decomposition analysis is conducted to reveal the quantitative contribution made by each of the proximate determinants to the decline of fertility in China over 1971-1999.

If the duration from Year 1 to Year 2 is the decomposition period, then:

$$\frac{TFR2}{TFR1} = \frac{C_m 2}{C_m 1} \times \frac{C_c 2}{C_c 1} \times \frac{C_a 2}{C_a 1} \times \frac{C_i 2}{C_i 1} \times \frac{TF2}{TF1} \qquad (4)$$

Taking natural log of the equation (4):

$$\ln\left(\frac{TFR2}{TFR1}\right) = \ln\left(\frac{C_m 2}{C_m 1}\right) + \ln\left(\frac{C_c 2}{C_c 1}\right) + \ln\left(\frac{C_a 2}{C_a 1}\right) + \ln\left(\frac{C_i 2}{C_i 1}\right) \qquad (5)$$

The proportionate contribution of each proximate determinant can be calculated as:

$$\ln\left(\frac{C_x 2}{C_x 1}\right) \Big/ \ln\left(\frac{TFR2}{TFR1}\right) \qquad (6)$$

where C_x is to be represented, respectively, by C_m, C_c, C_a and C_i. The decomposition refers to the ratio of the TFR i.e. $\frac{TFR2}{TFR1}$. The ratio is transformed to a percentage

difference by subtracting 1: percentage change = $\frac{TFR2}{TFR1}$-1, and the percentage point contribution of each of the proximate determinants is obtained as (Singh et al. 1985):

$$\ln\left(\frac{C_x 2}{C_x 1}\right)\Big/\ln\left(\frac{TFR2}{TFR1}\right)\times\left(\frac{TFR2}{TFR1}-1\right) \qquad (7)$$

The absolute effect of each component is established as:

$$\ln\left(\frac{C_x 2}{C_x 1}\right)\Big/\ln\left(\frac{TFR2}{TFR1}\right)\times(TFR2-TFR1). \qquad (8)$$

Bongaarts and Potter (1983: 107-108) developed an alternative approach to this decomposition through re-arranging equation (4) into the following:

$$\left(\frac{TFR2}{TFR1}-1\right)=\left(\frac{C_m 2}{C_m 1}-1\right)+\left(\frac{C_c 2}{C_c 1}-1\right)+\left(\frac{C_a 2}{C_a 1}-1\right)+\left(\frac{C_i 2}{C_i 1}-1\right)+I \qquad (9)$$

where *I* represents an interaction factor. This equation simply states that a proportional change in *TFR* from Year 1 to Year 2 equals the sum of the proportional changes due to the various proximate determinants plus an interaction term. Dividing each item at the right-hand side of the equation by the proportional change in *TFR* (left-hand side of the equation) yields the distribution of percentage of change in *TFR*. When this percentage distribution is multiplied by the absolute fertility decline (*TFR2-TFR1*), absolute change in *TFR* resulting from change in each of the proximate determinants is established. The two decomposition methods produce slightly different results.

Annex 2 Survey Questionnaires

1997 China National Demographic and Reproductive Health Survey

Individual Questionnaire

Address: Villagers' (Residents') Group:
Administrative Village (Town/Neighbourhood Committee):
Township (Town/Street Committee):
County (District/City):
Province (Autonomous Region/Municipality):

I. Background characteristics

101. When were you born (year/month, Solar calendar)?

102. Which ethnic group do you belong to?
1). Han. 2). Other ethnic groups (please specify)

103. What is your educational level?
1). Illiterate or semi-literate
2). Primary school
3). Junior middle school
4). Senior middle school
5). Secondary technical school
6). College and above

104. What is your marital status?
1). Never married **(skip to 201)**
2). First time married 3). Remarried
4). Divorced 5). Widowed

105. When were you married for the first time (year/month, solar calendar)?

★ **(skip to 201 if divorced or widowed)**

106. Which ethnic group does your husband belong to?
1). Han. 2). Other ethnic groups (please specify)

107. What is the educational level of your husband?
1). Illiterate or semi-literate. 2). Primary school
3). Junior middle school 4). Senior middle school
5). Secondary technical school 6). College and above

II. Health care during menstrual period

201. At what age did you have your first menstruation?

★ **(skip to 205 for those who have not had their first menstruation)**

202.Did you know that menstruation is just a normal phenomenon of girls when it first came?
1). Yes
2). No **(skip to 204)**

3). Cannot remember **(skip to 204)**

203. Where did you get the knowledge about menstruation?
1). Mother. 2). Other female family members
3). Friends or classmates 4). Teachers
5). Family planning workers 6). Medical workers
7). Books, magazines, TV or Radio 8). Other sources (please specify)
9). Cannot remember

204. What kind of materials do you use during menstrual period?
1). Menopause. 2). Nothing
3). Ordinary cloth or paper 4). Toilet paper
5). Sanitary napkin 6). Others (please specify)

205. Have you ever had any gynaecological discomfort? If yes, is it serious?
1). No **(skip to 208).** 2). Have light discomfort
3). Have serious discomfort

206. Have you seen a doctor for the discomfort? If yes, what's the result of diagnosis and treatment?
1). Never had any check-up
2). No gynaecological disease **(skip to 208)**
3). Have recovered **(skip to 208)**
4). Under treatment **(skip to 208)**
5). Gave up treatment half way for not having effects **(skip to 208)**
6). Had gynaecological disease but received no treatment

207. Reasons for not taking any gynaecological examinations
1). Inconvenient transport
2). Too expensive
3). Have no time
4). Feel embarrassed
5). Still bearable
6). Others (please specify)

208. Have you attended any organized gynaecological examinations? If yes, is it regular?
1). No. 2). Regularly. 3). Irregularly

★ **(Skip to 323 for never married)**

209. Did you and your husband receive premarital physical examination?
1). Both did **(skip to 211)**
2). Wife did but husband did not
3). Wife did not but husband did
4). Neither did

210. Reasons for not taking premarital examination
1). Did not know such exams were needed
2). Did not know where to perform such exams
3). No such service available in locality
4). Not required by related department
5). Inconvenient transport
6). Too expensive
7). Have no time
8). Not necessary
9). Others (please specify)

211. Have you received any premarital sex education? If yes, who organized it?
1). No
2). Organized by FP department
3). Organized by other department
4). Jointly organized by FP and other departments

III. Pregnancy and childbearing

301. Have you ever got pregnant?
1). Yes 2). No **(skip to 318)**
302.Have you ever had any live birth? If yes, how many?
Have you ever had any foetus death or still birth? If yes, how many?
Have you ever had miscarriage? If yes, how many times?
Have you ever experienced induced abortion? If yes, how many times?
Are you currently pregnant?
Then, the total number of pregnancies is:

Please tell something about each of your pregnancies chronologically:

A. Sequence of pregnancy 1st 2nd 3rd 4th 5th …
B. Outcome of pregnancy
1). Live male birth
2). Live female birth
3). Foetus death/still birth
4). Miscarriage
5). Induced abortion
6). Currently pregnant
C. Completion time of pregnancy
(questions D-F are for those whose answer to B is '1'or '2')
D. Sequence of live births
E. Months of pure breastfeeding
F. Health conditions of live births?
1). Healthy
2). Basically healthy
3). Sick but not disabled
4). Congenitally disabled
5). Disabled after birth
6). Dead
7).N/A

303. Have you ever been engaged in any of the following behaviour during pregnancy with youngest child?
1). Exposed to pesticide or chemical fertilizer
2). Smoking
3). Drinking alcohol
4). Taking antibiotic, analgesic and hormonal medicines
5). Having X-ray exam
6). Using computers or copiers frequently
7). Doing hard labour very often

304. Have you ever taken any prenatal health exams performed by professionals during pregnancy with youngest child?
1). Yes 2). No **(skip to307)**

305. Number of prenatal health exams:

306. Number of months into pregnancy at first prenatal health exam:

★ **(skip to 308)**

307. Major reason for not receiving prenatal health exams
1). Did not know such exams were needed
2). Did not know where to have such exams
3). Inconvenient transport
4). Too expensive
5). Have no time
6). Feel embarrassed
7). Not necessary
8). Others (please specify)

308. Place of delivery of the youngest child
1). Hospitals and MCH centers at and above county (district, city) level
2). Standard hospitals affiliated with institutions, the army and factories
3). FP service stations at and above county (district, city) level
4). Hospitals and MCH centers at township (town, sub-district) level
5). FP service centers at township (town, sub-district)level
6). Private clinics
7). At home
8).Others (please specify)

309. Birth attendant of your youngest child
1). Doctors in hospitals or MCH hospitals
2). Doctors in FP service centers
3). Private practitioners
4). Midwives
5). Family members
6). Others (please specify)

310. Have you ever experienced induced abortion (including abortion by drugs)?
1). Yes 2).No **(skip to 317)**

311. Reasons for your last induced abortion
1). Contraceptive failure
2). Fear of harm done to foetus by accidents during pregnancy
3). For the safety of mother
4). Changed mind for non-physical reasons
5). Not allowed by policy
6). Others (please specify)

312. Have you taken B ultrasonic examination before last induced abortion?
1). Yes 2). No

313. Number of months into pregnancy at last induced abortion

314. Place of last induced abortion
1). Hospitals and MCH centers at and above county (district, city) level
2). Standard hospitals affiliated with institutions, the army and factories
3). FP service stations at and above county (district, city) level
4). Hospitals and MCH center-s at township (town, sub-district) level
5). FP service centers at township (town, sub-district) level
6). Private clinics
7). In the village
8). Others (please specify)

315. Number of days of rest after you had induced abortion

316. When did you start sexual life after induced abortion?
1). Never since. 2). Within two weeks
3). 2~4 weeks 4). 1~2 months
5). After 2 months 6). Cannot remember
7). Refuse to answer

317. What do you think of the impact of induced abortion (excluding abortion by drugs)on your physical and mental health ?
1). No impact. 2). Some impact
3). Major impact 4). Others (please specify)
5). No idea

★ **(skip to 323)**

318. Reasons for not getting pregnant
1). Taking contraceptive measures **(skip to 323)**
2). Meagre sexual life. **(skip to 323)**
3). Not getting pregnant in the first year after marriage **(skip to 323)**
4). Others (please specify)

319. Have you or your husband ever gone to see a doctor for not getting pregnant?
1). Yes 2). No **(skip to 322)**

320. Place of check-up for not getting pregnant
1). Hospitals and MCH centers at and above county (district, city)level
2). Standard hospitals affiliated with institutions, the army and factories
3). FP service stations at and above county (district, city)level
4). Hospitals and MCH centers at township (town, sub-district)level
5). FP service centers at township (town, sub-district)level
6). Private clinics
7). Others (please specify)

321. What is the result of diagnosis?
1). Husband's reason 2). Wife's reason
3). Both husband and wife 4).Reason unknown
5). No abnormality

★ **(skip to 323)**

322. Reasons for not going to see a doctor
1). Did not know it was needed
2). Did not know where to see a doctor
3). Inconvenient transport
4). Too expensive
5). Have no time
6). Not necessary
7). Feel embarrassed
8). Others (please specify)

323. Have you ever adopted any child? If yes, how many boys and how many girls?

★ **(If the answer is "No", skip to 325)**

324. When was the youngest adopted child born?

325. How many children do you think is ideal for a family? And what should the sex be?
1). No child. 2). One boy
3). One girl 4). One child regardless of sex
5). One boy and one girl 6). Two boys
7). Two girls 8). Two children regardless of sex
9). At least one boy 10). At least one girl
11). At least one boy and one girl 12). The more, the better
13). Do not care 14). Others (please specify)
15). No idea

★ **(If unmarried, divorced or widowed, skip to 332)**

326. How long did you live with your husband during the last month?
1). Not at all (skip to 328). 2). Less than one week
3). 1-2 weeks 4). 23 weeks
5). 3-4 weeks 6). All the time

327.How many times did you have sex with your husband during the last month?

328. Are you satisfied with your sexual life?
1). Satisfied. 2). Basically satisfied
3). Just so-so 4). A little bit dissatisfied
5). Very dissatisfied 6). No idea
7). Others (please specify) 8). Refuse to answer

329. Can wife initiate sex? If yes, will you?
1). No 2). Yes, but it is difficult to do
3). Yes and possible. 4). No idea
5). Refuse to answer

330. Can wife refuse to have sex with husband? If yes, will you?
1). No. 2). Yes, but it is difficult to do
3). Yes and possible 4). No idea
5). Refuse to answer

331. Is it appropriate to have sex during the following periods?
1. Menstrual period
2. 1-3 months into pregnancy
3. 4-6 months into pregnancy
4. 7-9 months into pregnancy
5. Lying-in period

332. Do you agree on pre-marital sex between two persons about to marry?
1). Yes 2). No
3). No idea 4). Refuse to answer

333. So far as you know, is there anybody around you who had sex before marriage? If yes, how many?
1). None. 2). Few
3). Some 4). Popular
5). Don't know 6). Refuse to answer

★ **(If unmarried, skip to 418)**

IV. Knowledge and practice of contraception

401. Did you use any contraceptive method for first sexual act?

1). Yes 2). No (skip to 403)

402. Which contraceptive method did you use for first sexual act?
1). Oral pills 2). Injectables
3). Condom 4). Spermicide
5). Rhythm 6). Withdrawal
7). Others (please specify)

★ **(For current married, skip to 405, and for divorced or widowed, skip to 418)**

403. Reasons for not using any contraceptive method for first sexual act
1). Want to have a child
2). Have never thought of it or not aware of the need
3). Wanted method unavailable
4). Fear of affecting sex life on the part of wife
5). Fear of affecting sex life on the part of husband
6). Fear of side-effects
7). Cannot use because of disease
8). Others (please specify)

404. Did you use any contraceptive method after the first sexual act? If yes, when did you use it for the first time?
1). Not using any contraceptive method (skip to411)
2). After the second live birth
3). After the first live birth
4). Before the first live birth
5). Cannot remember

★ **(for divorced or widowed, skip to 418)**

405. Are you currently using any contraceptive method? If yes, what kind of method are, you using?

1). Not using any method	**(skip to 410)**
2). Male sterilization	**(skip to 408)**
3). Female sterilization	**(skip to 408)**
4). Subdermal implant	**(skip to 408)**
5). IUD	
6). Oral pills or injectables	**(skip to 407)**
7). Condom	**(skip to 407)**
8). Spermicide	**(skip to 407)**
9). Others (please specify,)	**(skip to 408)**

406. Do you know the type of IUD you are currently using?
1). No 2).Yes (please specify)

★ **(skip to 408)**

407. From what channel do you usually obtain your contraceptives? Are they free?
1). Delivered to home free of charge by FP workers
2). Obtained from FP department free of charge
3). Delivered by FP workers with payment
4). Bought from shops
5). Obtained from relatives, friends or neighbours
6). Others (please specify)

408. How did you decide on the currently used contraceptive method?
1). Recommended by FP workers

2). Selected by husband and relatives
3). Recommended by professionals and technicians
4). Suggested by non-professionals
5). By myself
6). Others (please specify)

409. What is your husband`s attitude towards the currently used method?
1). Agreed. 2). Did not care
3). Disagreed. 4). No idea

★ **(skip to 411)**

410. Reasons for not using any contraceptive method
1). Not aware of the need
2). Wanted method unavailable
3). Fear of affecting the quality of sexual life
4). Fear of side-effects
5). Want to have a child
6). Pregnant
7). Breast-feeding
8). Cannot use it because of disease
9). Infertility
10). Not living with husband
11). Menopause
12). Others (please specify)

411. Who do you think should have sterilization, wife or husband?
1). Wife. 2). Husband. 3). Don't care

412. Have you ever experienced contraceptive failure?
1). Yes 2). No **(skip to 414)**

413. What kind of method did you use at the last contraceptive failure?
1). Male sterilization
2). Female sterilization
3). IUD
4). Subdermal implant
5). Oral pills or injectables
6). Condom
7). Spermicide
8). Others (please specify)

414. Which period is most likely for women to get pregnant?
1). Menstrual period
2). A few days before and after menstruation
3). Between two menstrual periods
4). About 14 days before menstruation
5). Do not know

415. Is it necessary to take contraceptive measures between giving birth and resumption of menstruation?
1). Yes 2). No **(skip to 417)**

416. Which of the following four methods is not appropriate for women during breastfeeding?
1). Condom. 2). IUD
3). Oral pills or injectables 4). Subdermal implant

5). Don't know

417. What should a woman do if she forgot taking oral pills once?
1). Continue to take it 2). Take one more the next day
3). Stop taking it 4). Switch to another method
5). Others (please specify). 6). No idea

418. Is it necessary to offer sex education in school? If yes, when should it start?
1). No. 2). Before junior middle school
3). Junior middle school 4). Senior middle school
5). After senior middle school 6). No idea

419. Is it necessary to offer counselling service on contraception to unmarried young people?
1). Yes 2). No 3). No idea

420. Should we provide contraceptives to unmarried young people?
1). Yes 2). No 3). No idea

★ **(for unmarried, skip to 601)**

V. Family planning technical service

501. Have you ever received the following clinical operations? How many times for each?
1. Female sterilization
2. Reversal of female sterilization
3. Subdermal implant
4. Removal of subdermal implant
5. Insertion of IUD
6. Removal of IUD
7. Induced abortion (excluding abortion by drugs)

★ **(if none of the above, skip to 509)**

502. When did you receive the last birth control operation?

503. What kind of birth control operations did you receive for the last time?
1. Female sterilization
2. Reversal of female sterilization
3. Subdermal implant
4. Removal of subdermal implant
5. Insertion of IUD
6. Removal of IUD
7. Induced abortion (excluding abortion by drugs)

504. Where did you have the last operation?
1). Hospitals and MCH centers at and above county (district, city) level
2). Standard hospitals affiliated with institutions, the army and factories
3). FP service stations at and above county (district, city) level
4). Hospitals and MCH center-s at township (town, sub-district) level
5). FP service centers at township (town, sub-district) level
6). Private clinics
7). In the village
8). Others (please specify)

505. Did the doctor brief you on the operation before doing it?
1). Yes 2). No 3). Can't remember

506. Did service providers give you any instructions on contraception and health care after the operation?
1). Yes 2). No 3). Can't remember

507. Did service providers pay any follow-up visits to you? If yes, when was the first time?
1). No. 2). Within one week 3).1~2 weeks
4).2~4 weeks 5). 1~2 months. 6). 2~3 months
7).3~6 months 8).Over 6 months 9). Can't remember

508. In general, are you satisfied with the service offered by the service providers before and after the operation?
1). Very satisfied 2). Satisfied. 3). Just so-so
4). A little bit dissatisfied 5). Very dissatisfied 6). No idea

509. Have you ever been to local FP service station?
1). Yes 2). No **(skip to 601)**

510. Which of the following aspects of FP service station do you think needs to be improved?
1. Working attitude and style
2. Sanitary condition
3. Check-up and treatment settings,
4. Professional level of service providers
5. Counselling or to-the-door services

VI. Sexually transmitted diseases (STDs) and AIDS

601. Have you ever heard of VD/STDs?
1).Yes 2).No **(skip to 603)**

602. Where did you get the information?
1). FP department. 2). Health department
3). Other departments 4). Family members
5). Friends, relatives or neighbors 6). Radio or TV
7). Books or magazines 8). Street posters
9). Others (please specify)

603. Have you ever heard of AIDS? If yes, how much do you know about it?
1). Never heard of **(skip to 701)**
2). Heard of, but know little about it
3).Heard of, and know something about it

604. Is it possible for one to contract AIDS through the following ways?
1. Blood transfusion
2. Injections
3. Hug or handshake
4. Kissing
5. Having multiple sex partners
6. From mother to foetus
7. Dining with HIV carriers

VII. Health care during menopausal period

701. Do you still have menstruation? If no, when did it stop?

★ **(If still have menstruation, skip to 801)**

702. What kind of service did you need most before and after menopause?
1). Nothing. 2). Psychological
3). Physical 4). Both '2)'and '3)'
5). Others (please specify)

703. Did FP department provide you with any service relating to menopause?
1). Yes (please specify). 2). No

VIII. Other questions

801. Which of the following information/knowledge is what you need most?
1). FP policy and regulations
2). Sex knowledge
3). Knowledge about contraception
4). Knowledge about healthier birth and good up-bringing of children
5). Knowledge about MCH care
6). Information on income-generating and employment
7). None of the above

802. Have you ever received any financial assistance from the related departments?
1). Yes 2). No **(skip to 804)**

803. What is the specific assistance you received?
1. Projects on income-generating
2. Information on cash-making
3. Loans and funds for alleviating poverty
4. Priority in obtaining productive materials
5. Training on production technology
6. Help in product marketing
7. Priority in employment
8. Reduce and exemption of voluntary labour
9. Help in buying FP insurance series
10. Support in education of children

804. Cooperation of the interviewee
1). Very good
2). Good
3). Average
4). Poor
5). Very poor

Signature of enumerator: _____

This is the end of the interview, thank you for your cooperation!

2002 Fertility and Abortion Survey

(Married Women aged 20-45)

Province _____

County _____

Township _____

Village _____

Respondent:

Date of birth _____

Date of first marriage _____

Ethnic group _____

Household registration _____

Level of education _____

Marital status _____

Occupation _____

Husband:

Date of birth _____

Ethnic group _____

Household registration _____

Level of education _____

Occupation _____

A. Pregnancy	
A1 Total number of pregnancies ? (0 if no)	
A2 Total number of induced abortions ?	
A3 Total number of children ever born ? (0 if no)	_____children , ____boys , ____girls
A4 Method of contraception in current use ?	
A5 Do you know if B-scan can detect sex of foetus ?	
A6 If know, from whom you get the information ?	
A7 Do you know at what duration of gestation the sex of foetus can be detected by B-scan ?	_____months
A8 Do you think the sex of foetus can be accurately detected by B-scan ?	
A9 Have you ever done sex-selective abortion after B-scan ?	
A10 If have, how many times ? Of which how many are boys and girls?	_____times , _____boys , _____girls
A11 How often women around you do B-scan after pregnancy for detecting sex ?	
A12 Do you know prenatal sex determination is illegal ?	
A13 Do you think induced abortion is harmful to women's health ?	

B. Childbearing								
Pregnancy order	1st	2nd	3rd	4th	5th	6th	7th	8th
B1 Date of start of pregnancy								
B2 Date of end of pregnancy								
B4 You wish to have (1) a boy (2) a girl (3) no preference								
B5 Did you do B-scan when in pregnancy ? (1) yes (2) no								
B6 How many times ?								
B7 Purpose of doing B-scan (1) usual pregnancy check (2) sex detection								
B8 Did B-scan at what duration of pregnancy ?								
B9 Where you did B-scan ? (1) county hospital (2) township hospital (3) county family planning station								

(4) township family planning station (5) private clinics (6)others								
B10 Do you know the sex of the foetus before birth ? (1) boy (2) girl (3) do not know								
B11 Pregnancy outcome (1) live-born boy (2) live-born girl (3) still-birth boy (4) still-birth girl (5) induced abortion boy (6) induced abortion girl (7) induced abortion, unknown sex (8) miscarriage boy (9) miscarriage girl (10) miscarriage, unknown sex (11) currently pregnant (12) others								
B12 If induced abortion, why? (1) want no more children (2) want but policy does not permit more (3) want but spacing not enough according to policy (4) contraceptive failure (5) not the preferred sex (6) In case of affecting health of child (7) In case of affecting health of herself (8) the current child is too small, want to delay the next child (9) others								
B13 If induced abortion, where? (1) county hospital (2) township hospital (3) county family planning station (4) township family planning station (5) private clinics (6) others								
B14 If and use what contraceptive method? (1) sterilization (2) IUD (3) pill (4) condom (5) others								

C Fertility preferences

C1 What do you think is the ideal number of children for a family ?	_____children , of which_____boys , _____girls
C2 How many children do you want under the current policy ?	_____children , of which_____boys , _____girls
C3 Do you think only sons can carry on the family line ?	(1) yes (2) no (3) do not know
C4 Do you think only sons can provide old-age support to you ?	(1) yes (2) no (3) do not know
C5 What are the main purposes of having a boy?	
C6 What are the main purposes of having a girl?	

C7 Do you think the number of children you have	(1) enough (2) more than enough (3) not enough
C8 Do you think boys are not (more than) enough, or girls are not (more than) enough ?	(1) both are enough (2) boys are not enough (3) girls are not enough (4) boys are more than enough (5) girls are more than enough (6) both boys and girls are more than enough (7) others
C9 Why do not you want more children ?	(1) enough (2) unaffordable (3) too busy, no time (4) enjoy myself (5) policy not allowed (6) relieve family burden (7) worry for the country (8) health problems (9)others
C10 What do you think of the current policy?	(1) too strict (2) just OK (3) too loose (4) do not know

D. Family economic situation	
D1 Who is the main income earner?	(1) yourself (2) husband (3) children (4) parents-in-law (5) others
D2 What work do you do?	(1) agriculture (2) housework (3) sideline (4) job in township or village enterprises (5) small business (6) teacher (7) others (please specify)
D3 What work does your husband do?	(1) agriculture (2) housework (3) sideline (4) job in township or village enterprises (5) small business (6) teacher (7) others (please specify)
D4 Have you ever been a migrant worker in cities? How long and where?	(1) yes (2) no if yes, _____months
D5 Has your husband been a migrant worker in cities? How long and where?	(1) yes (2) no if yes, _____months
D6 Total income of your family last year	_____ yuan
D7 Total income of yourself last year	_____yuan

Thank you for cooperation !